Supreme Court, U.S.
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No. _____

In The

Supreme Court of the United States

October Term, 1997

WAYNE K. PFAFF,

Petitioner,

v.

WELLS ELECTRONICS, INC.,

Respondent.

On Petition For A Writ Of Certiorari To The United States Court Of Appeals For The Federal Circuit

PETITION FOR WRIT OF CERTIORARI

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QUESTIONS PRESENTED

Section 102(b) of Title 35 provides, in pertinent part, that a person is entitled to a patent unless the invention was "on sale" more than one year prior to the date on which the application for United States patent was filed. Wayne K. Pfaff filed an application for patent on April 19, 1982 and his patent issued on January 1, 1985. At the time Mr. Pfaff filed his application, consistent with the plain language of Section 102(b), its legislative history, and relevant case law, it was settled that the one-year grace period did not start until the invention had been "fully completed."

In 1997, the Federal Circuit expressly rejected the statutory "fully completed" condition precedent and instead held that the one-year grace period may start when an invention has been only "substantially completed." Mr. Pfaff's invention was not fully completed more than one year before his April 19, 1982 filing date, but the Federal Circuit held it was substantially completed more than one year before that date and thus entered judgment that his United States Patent, No. 4,491,377, was invalid in view of the "on sale" provision of Section 102(b).

The questions presented are:

1) In view of the longstanding statutory definition that the one-year grace period to an "on sale" bar can start to run only after an invention is fully completed, should the Pfaff patent have been held invalid under 35

QUESTIONS PRESENTED – Continued

U.S.C. § 102(b) when Mr. Pfaff's invention was admittedly not "fully completed" more than one year before he filed his patent application?

2) Whether the Federal Circuit's newly created judicial rule – that "substantial completion" of an invention is sufficient to start the one-year grace period to the "on sale" bar – should be applied only prospectively, to avoid a "taking" of Mr. Pfaff's patent property in violation of the Fifth Amendment to the United States Constitution?

LIST OF PARTIES

The parties to the proceedings below were the Petitioner, Wayne K. Pfaff, and the Respondent, Wells Electronics, Inc.

The Respondent before this Court is Wells Electronics, Inc.

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PETITION FOR WRIT OF CERTIORARI

The Petitioner Wayne K. Pfaff respectfully prays that a writ of certiorari issue to review the judgment and opinion of the United States Court of Appeals for the Federal Circuit, entered in the above-entitled proceeding on September 8, 1997. A petition for rehearing was timely filed but denied by that court on October 3, 1997.

OPINIONS BELOW

The opinion of the Court of Appeals for the Federal Circuit is reported at 124 F.3d 1429, and is reprinted in the appendix hereto, p. App. 1, *infra*. The denial of the petition for reconsideration has not been reported and is reprinted in the appendix hereto, p. App. 170, *infra*.

The Report and Findings of Fact and Conclusions of Law of Special Master, filed October 19, 1995, has not been reported. It is reprinted in the appendix hereto, p. App. 23, *infra*. The Final Judgment on Liability of the United States District Court for the Northern District of Texas (Sanders, B.), entered December 29, 1995, has not been reported. It is reprinted in the appendix hereto, p. App. 21, *infra*. The earlier opinion of the United States Court of Appeals for the Federal Circuit, reversing summary judgment of non-infringement, is reported at 5 F.3d 514 and is reprinted in the appendix hereto, p. App. 155, *infra*.

JURISDICTION

Jurisdiction in the United States District Court for the Northern District of Texas was pursuant to the provisions of 28 U.S.C. § 1338(a). The appeal to the United States Court of Appeals for the Federal Circuit was timely taken pursuant to the provisions of 28 U.S.C. §§ 1295, 2107. The jurisdiction of this Court to review the judgment of the Federal Circuit is invoked under 28 U.S.C. § 1254(1). The judgment of the Federal Circuit sought to be reviewed was entered on September 8, 1997 and, after a timely petition for rehearing was filed, the order denying rehearing was entered on October 3, 1997.

CONSTITUTIONAL PROVISION AND STATUTES INVOLVED

Fifth Amendment

> No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the Militia, when in actual service in time of War or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.

35 U.S.C. § 102. Conditions for patentability: novelty and loss of rights to patent

A person shall be entitled to a patent unless –

* * *

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

* * *

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention, there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

35 U.S.C. § 261. Ownership; assignment

Subject to the provisions of this title, patents shall have the attributes of personal property.

* * *

STATEMENT OF THE CASE

Wayne K. Pfaff ("Mr. Pfaff") fulfilled a long-felt need in the semiconductor industry when he invented a socket to hold leadless semiconductor chip carriers for purposes

of testing. According to the district court, not only was the Pfaff invention "totally new with respect to each component part," but the commercial success achieved by this invention was "dramatic." App. 21-22, 126, 149.

Mr. Pfaff began to develop the patented subject matter in late 1980 or early 1981 after Texas Instruments, a company sophisticated in making and testing computer chips, approached at least four businesses, including that of Mr. Pfaff, in search of a new computer chip test socket. Mr. Pfaff obtained a written purchase order on April 8, 1981, but the purchase order was expressly conditioned on the socket functioning to the purchaser's satisfaction. An application for patent was filed on the Pfaff invention on April 19, 1982, and he was awarded United States Patent No. 4,491,377 (the "Pfaff '377 Patent") on January 1, 1985. It is undisputed that Mr. Pfaff's invention was not fully completed until sometime after the critical "statutory bar" date in April 1981 had passed.

This is the second time Mr. Pfaff has sued Wells Electronics, Inc. ("Wells") for infringement of the Pfaff '377 Patent. In the first case, reported at 9 U.S.P.Q.2d 1366 (N.D. Ind. 1988), App. 198, the United States District Court for the Northern District of Indiana ruled that Wells' then-accused devices did not infringe the Pfaff '377 Patent. The trial court also held that the absence of completion of the Pfaff invention (lack of "reduction to practice" in patent parlance) before the critical date meant that the patented invention could not have been on sale more than one year before Mr. Pfaff's application for patent was filed. App. 224-25. On cross-appeals to the United States Court of Appeals for the Federal Circuit from the decision of the Indiana court, the finding of non-

infringement was affirmed and the holding of validity was vacated as moot. 884 F.2d 1399 (Fed. Cir. 1989), App. 229.

Shortly thereafter, a modified Wells socket design appeared in the marketplace. Mr. Pfaff filed the instant suit for patent infringement in the United States District Court for the Northern District of Texas, No. 3:91-CV-1542-H. The district court initially granted summary judgment of non-infringement in favor of Wells. That judgment was reversed by the Federal Circuit and remanded for further proceedings. 5 F.3d 514 (Fed. Cir. 1993), App. 155. On remand, the case was referred to a Special Master for a non-jury trial. The Special Master's Findings of Fact and Conclusions of Law were adopted by the district court as its opinion, App. 21. In pertinent part, the district court held that the Pfaff invention was not on sale within the meaning of § 102(b) and that certain claims of the Pfaff '377 Patent were infringed by Wells. On appeal, the Federal Circuit explained that the sole reason the district court had not applied the on-sale bar was that the invention had not been reduced to practice, because there was no physical embodiment of the invention. App. 7-8. The appellate court, however, held that Mr. Pfaff's invention "was substantially complete" before the critical date, and, was thus on sale within the meaning of Section 102(b). App. 9. Accordingly, the claims in issue of the Pfaff '377 Patent were held to be invalid. App. 10, 20.

The basis for federal jurisdiction in the court of first instance is 28 U.S.C. § 1338(a).

REASONS FOR GRANTING THE WRIT

I. The Federal Circuit's Decision Below, Invalidating the Pfaff '377 Patent Based on the Invention Being "Substantially Completed," Represents Impermissible Judicial Legislation that Thwarts Congressional Intent.

This case presents an issue of importance to inventors and, particularly, to those who create inventions having commercial potential. Section 102(b) of the Patent Act of 1952, as amended (Title 35 of the United States Code), provides, in part:

> A person shall be entitled to a patent unless –
>
> . . . .
>
> (b) the invention was . . . in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States. . . .

35 U.S.C. § 102(b). The plain language of the statute requires that an "invention," and nothing less (*i.e.*, not a "substantially complete" invention) be "on sale" to start the running of the one-year grace period.[1]

---

[1] Congress legislatively defined "invention" to consist of two facets: "conception" and "reduction to practice." 35 U.S.C. § 102(g). Conception occurs when the inventor has sufficient concepts and information relating to the invention, so that a person skilled in the art could (if in possession of the inventor's thoughts and work) actually construct the invention. Reduction to practice occurs when the invention has actually been constructed in physical, tangible form. P. J. Federico, 2 *International Review of Industrial Property and Copyright Law* 368, 369 (1971). Therefore, an invention is fully completed when it is reduced to practice and exists in physical, tangible form.

That Congress intended such a reading of the statute is confirmed by the legislative history of 35 U.S.C. § 102(b) and its predecessors.[2]

The policy that an inventor should not have the unfettered right to complete and market an invention, and only later seek patent protection, has long been a part of the United States patent laws.[3] The Patent Act of 1839 first introduced a statutory grace period (then two years).[4] As this Court explained in *Andrews v. Hovey* [*The Driven Well Cases*], 123 U.S. 267 (1887), the object of adopting the two-year grace period "was to require the inventor to see to it that he filed his application within two years *from the completion of his invention, . . .* " *Id.* at 274 (emphasis added).[5]

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[2] Although reference to the legislative history may be unnecessary when the plain meaning of a statute is clear on its face, this Court has looked to legislative history for confirmation of the intended meaning of a statute. *See, e.g., Negonsott v. Samuels*, 507 U.S. 99, 106 (1993) (although "resort to secondary materials is unnecessary in this case, the legislative history . . . supports our construction"); *Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 574 (1982) (legislative history "confirms that Congress intended the statute to mean exactly what its plain language says").

[3] *See* Patent Act of 1836, ch. 357, § 6, 5, Stat. 117 (1836) (repealed; current version codified as amended in 35 U.S.C. § 102(b)).

[4] Patent Act of 1839, ch. 88, § 7, 5, Stat. 353-355 (1836) (repealed, current version codified as amended in 35 U.S.C. § 102(b)).

[5] The Consolidated Patent Act of 1870 preserved the two-year grace period attached to the on-sale bar substantively unchanged. Ch. 230, § 1 et seq., 16 Stat. 198 (1870).

In 1939, the two-year grace period, then codified in section 4886 of the Revised Statutes, was reduced to one year.[6] The legislative history of the 1939 Act reiterated Congress' original and continuing intent that an invention be *fully completed* before the statutory grace period begins to accrue. The House and Senate Reports accompanying the 1939 Act state as follows:

> The [previous version of the] law . . . permits an inventor, after his invention is *fully completed*, to make the invention known to the public for a period of 2 years before the filing of his application for patent.
>
> . . . . Under present conditions 2 years appears unduly long and operates as a handicap to industry. Reduction of the period [to one year] would serve to bring the date of patenting closer to the time *when the invention is made*. . . .

H.R. Rep. No. 961, 76th Cong., 1st Sess. 1 (1939) (emphasis added); S. Rep. No. 876, 76th Cong., 1st Sess. 1 (1939) (same language). Congress thus affirmed its intent that "full completion" of an invention remain a prerequisite to the application of the on-sale bar. This is also confirmed in Section 102(g) of Title 35, which specifically refers to and deals with "conception" and "reduction to practice", the two facets of an invention.[7]

The last relevant revision of the patent laws was undertaken in 1952. The Patent Act of 1952, which codified the patent laws in Title 35 of the United States Code,

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[6] Patent Act of 1939 (the "1939 Act"), ch. 450, § 1, 53 Stat. 1212.

[7] *See* footnote 1, *supra*.

included no substantive changes to the on-sale bar.[8] The current version of section 102(b) remains identical to that enacted in 1952. *See* 35 U.S.C. § 102(b).

There should be no doubt, from the statutory language and the legislative history, that Congress intended that the statutory grace period not begin to run until an invention is "fully completed." A substantial body of appellate case law, moreover, routinely applied the rule that Section 102(b) requires an invention to at least be "fully complete" ("reduced to practice") before the statutory grace period begins to accrue.[9] Regional circuit courts consistently effectuated the congressional mandate that the one-year grace period to the "on sale" bar not start until the invention had been fully completed.[10]

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[8] The Senate Report accompanying the Patent Act of 1952 specifically states that "Section 102 in paragraphs (a), (b), and (c) repeats the conditions in the existing law relating to novelty." S. Rep. No. 1979, 82d Cong., 2d Sess. (1952), *reprinted in*, 1952 U.S.C.C.A.N. 2394, 2399. The only change in these paragraphs is "that due to division into lettered paragraphs." *Id.* at 2410 (revision notes to Section 102).

[9] By the early 1900's, full completion of the invention was an absolute prerequisite to the invocation of the on-sale bar. *See, e.g., M'Creery Eng. Co. v. Massachusetts Fan Co.*, 195 F. 498, 503 (1st Cir. 1912); *Burke Electric Co. v. Independent Pneumatic Tool Co.*, 234 F. 93 (2d Cir. 1916). Indeed, this early twentieth century caselaw not only required actual reduction to practice, but also that product be "on hand." *Id.*

[10] *See, e.g., Americo Contact Plate Freezers, Inc. v. Belt-Ice Corp.*, 316 F.2d 459, 465 (9th Cir.), *cert. denied*, 375 U.S. 902 (1963); *In re Yarn Processing Patent Validity Litigation*, 498 F.2d 271, 277 (5th Cir.), *cert. denied*, 419 U.S. 1057 (1974); *Timely Prods. Corp. v. Arron*, 523 F.2d 288, 302 (2d Cir. 1975); *CTS Corp. v. Piher Int'l Corp.*, 593 F.2d 777, 779 (7th Cir.), *cert. denied*, 444 U.S. 884 (1979);

Likewise, the Court of Claims and the Court of Customs and Patent Appeals (the predecessor courts to the Federal Circuit) followed the rule that "reduction to practice" was necessary before the one-year grace period commenced to run.[11]

Thus, at the time Petitioner's patent application was filed on April 19, 1982, the law governing the start of the grace period to the Section 102 on-sale bar was well-established, not only by the clear language of the statute and its legislative history, but also by a substantial body of case law. In keeping with the law as it existed at that time, Petitioner filed his application within one year after the completion of his invention, and his patent, No. 4,491,377, issued therefrom on January 1, 1985.

It is axiomatic that the ultimate objective of statutory interpretation "is to give effect to the will of Congress. . . ." *Griffin*, 458 U.S. at 570. In discerning the intent of Congress, the Court looks to the explicit language of the statute and its structure and purpose. *Ingersoll-Rand, Co. v. McClendon*, 498 U.S. 133, 138 (1990). When the will of Congress "has been expressed in reasonably plain terms, 'that language must

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Digital Equipment Corp. v. Diamond, 653 F.2d 701, 718 (1st Cir. 1981); *Stewart-Warner Corp. v. City of Pontiac, Mich.*, 717 F.2d 269 (6th Cir. 1983); *Dataq, Inc. v. Tokheim Corp.*, 736 F.2d 601, 604-05 (10th Cir. 1984).

[11] *In re Theis*, 610 F.2d 786, 791-92 (C.C.P.A. 1979); *In re Corcoran*, 640 F.2d 1331, 1333-34 (C.C.P.A. 1981); *General Electric Co. v. United States*, 654 F.2d 55, 62 (Ct. Cl. 1981). The decisions of the Court of Claims and the Court of Customs and Patent Appeals predating October 1, 1982 were adopted as precedent by the Federal Circuit, sitting *en banc*, in late 1982. *South Corp. v. United States*, 690 F.2d 1368, 1370 (Fed. Cir. 1982).

ordinarily be regarded as conclusive.' " *Griffin*, 458 U.S. at 570 (citation omitted). Congress may amend statutes; the courts may not. *Id.* at 576.

In rejecting the statutory requirement that an invention be "fully completed" before the one-year grace period can begin to run, and, thus, holding Petitioner's patent invalid under the lesser "substantially complete" standard, the Federal Circuit has ignored this Court's basic tenets of statutory construction and created a rule of construction that contravenes the Congressional desire to provide inventors with a universally understood, easily applied and predictable bright-line test. The Federal Circuit did not merely make a refinement to existing law; it made an enormous, unauthorized change. Its new test will inevitably result in case-by-case resolution that differ in outcome for reasons known only to the appellate court. As a result, the Federal Circuit has created an additional area of unpredictability in the patent system, ignoring the contrary policy decision by Congress (which intended to enhance predictability), to the detriment of inventors, and, ultimately, the public.[12] *UMC Electronics*, 816 F.2d at

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[12] This "substantially completed" interpretation is the end of an unauthorized multi-year effort by the Federal Circuit. In 1984, in *Barmag Barmer Maschinefabrik AG v. Murata Mach. Ltd.*, 731 F.2d 831, 836-37 (Fed. Cir. 1984), the appellate court although acknowledging its predecessor court had followed the general rule that made actual reduction to practice on absolute necessity, opined in *dicta* that such might not always be the case. Beginning with *UMC Electronics Co. v. United States*, 816 F.2d 647, 652, 656-57 (Fed. Cir. 1987) (holding "that reduction to practice is not always a requirement of the on-sale bar"), *cert. denied*, 484 U.S. 1025 (1988), the Federal Circuit has impermissibly substituted its own judgment for that of the

664-65 (Fed. Cir. 1987) (Smith, J. dissenting); *Atlantic Thermoplastics Co. v. Faytex, Inc.*, 5 F.3d 1477, 1482-87 (Fed. Cir. 1993) (Radar, J., dissenting). This Court's guidance about the proper construction of the statutory "on sale" bar is important, not only to Petitioner, but also to inventors and technology-based businesses in general.

II. The "Substantially Complete" Standard, Applied Retroactively, Constitutes a Violation of the "Takings Clause" of the Fifth Amendment to the Constitution.

The Fifth Amendment to the United States Constitution, in pertinent part, provides:

> No person shall . . . be deprived of life, liberty, or property without due process of law, *nor shall private property be taken for public use, without just compensation.*

U.S. Const. amend. V (emphasis added). The Fifth Amendment protects private property, both real and personal, including intellectual property. *See, e.g., Ruckelshaus v. Monsanto Co.*, 467 U.S. 986, 1001-04 (1984)

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legislature and, in the process, has broadened the scope of the on-sale bar well beyond that mandated by the Congress. The Federal Circuit's adoption of the "substantial completion" standard, applied in this case, or any other standard requiring less than a *fully completed* invention as a prerequisite to the start of the one-year grace period, imposes on inventors yet another burden – that of electing whether to incur the expense of patent procurement without an actual product, often during a period of undercapitalization. It also has the potential for chilling research efforts in joint ventures.

(trade secrets in the form of data are cognizable as property "protected by the Taking Clause of the Fifth Amendment"); *Pittman v. Chicago Board of Ed.*, 64 F.3d 1098, 1104 (7th Cir. 1995) ("property" as used in the Takings Clause "encompasses real and personal property, including intellectual property"), *cert. denied*, ___ U.S. ___, 116 S. Ct. 2497 (1996).[13]

That patents are not only a form of intellectual property, but also personal property, is made clear by Congress: "Subject to the provisions of this title, patents shall have the attributes of personal property." 35 U.S.C. § 261.[14] Petitioner's patent rights, then, are clearly entitled to the full protection of the Fifth Amendment. Invalidation of Petitioner's patent through retroactive application of the Federal Circuit's new rule that the one-year grace period may start upon "substantial completion" of an invention is nothing less than a judicial taking.

The Takings Clause of the Fifth Amendment applies not only when the government exercises its power of eminent domain to take ownership of private property, but also when government action works to destroy an owner's property right or denies the owner any economically viable use of his property. *See, e.g., Pennsylvania Coal*

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[13] *Cf. Leesona v. United States*, 599 F.2d 958, 965 (Ct. Cl.) (when the government infringes a patent "it is deemed to have 'taken' the patent license under an eminent domain theory and just compensation is required by the Fifth Amendment"), *cert. denied*, 444 U.S. 991 (1979); *Techtronix, Inc. v. United States*, 196 U.S.P.Q. 204 (Ct. Cl. 1977).

[14] This provision long preceded Mr. Pfaff's invention. *See also* Howe, *Holmes-Pollack Letters* 53 (2d ed.).

Co. v. Mahon, 260 U.S. 393, 414 (1922); *Dolan v. City of Tigard*, 512 U.S. 374, 383-396) (1994). Furthermore, the government "cannot be permitted to defeat the constitutional prohibition against taking property without due process of law by the simple device of asserting retroactively that the property it has taken never existed at all." *Hughes v. Washington*, 399 U.S. 290, 296-97 (1967) (Stewart, J., concurring). The "retroactive transformation of private into public property" achieves the same result as an exercise of eminent domain. *Id.*

The constitution protects property owners not only from legislative and administrative actions that deprive them of their property without just compensation, but also from judicial actions that amount to such takings. *See, id.* at 298. "No more by judicial decree than by legislative fiat" may private property be transformed into public property without just compensation. *Stevens v. City of Cannon Beach*, 510 U.S. 1207 (1994) (Scalia, J., dissenting from denial of petition for writ of certiorari). Such judicial actions may include an unexpected departure from long-standing judicial precedent. *See Robinson v. Ariyoshi*, 441 F. Supp. 559 (D. Hawaii 1977), *aff'd in relevant part*, 753 F.2d 1468 (9th Cir. 1985), *vacated on other grounds*, 475 U.S. 902 (1986).

The Federal Circuit's decision in this case rejects the law as it existed at the time of Petitioner's April 1982 patent application. The Federal Circuit, by holding Mr. Pfaff's patent invalid under Section 102(b) after using the new "substantially completed" standard to prematurely exhaust the one-year grace period to the on-sale bar, effectively appropriated Petitioner's invention for free use by the public. Such action amounts to a taking of

Petitioner's '377 Patent within the meaning of the Takings Clause of the Fifth Amendment. This judicial taking, moreover, impacts not only Petitioner, but also other inventors who relied on then-existing settled law that effectuated the plain meaning of 35 U.S.C. § 102(b).

CONCLUSION

For the foregoing reasons, Petitioner respectfully requests that the Court grant this Petition for Writ of Certiorari.

Respectfully submitted,

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APPENDIX

Opinion of the United States Court of Appeals for the Federal Circuit, dated September 8, 1997, cross-appeals from Final Judgment on Liability entered by trial court in 3:91-CV-1542-H ....App. 1

Final Judgment on Liability in 3:91-CV-1542-H (N.D. Tex. 1995) .....App. 21

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Wayne K. PFAFF, Plaintiff/Cross-Appellant,
v.
WELLS ELECTRONICS, INC., Defendant-Appellant.

Nos. 96-1150, 96-1187.

United States Court of Appeals, Federal Circuit.

Sept. 8, 1997.

Rehearing Denied Oct. 3, 1997.

Barry L. Grossman, Banner & Allegretti, Ltd. of Washington, DC, argued for plaintiff/cross-appellant. With him on brief were Pamela I. Banner, Adriana S. Luedke, and Bradley C. Wright.

James D. Hall, Baker & Daniels, of South Bend, IN, argued for defendant-appellant. With him on brief were David C. Read and Robert D. Null. Of counsel on brief were David R. Melton and Gerard T. Gallagher, Barnes & Thornburg, of South Bend, IN.

Before ARCHER, Chief Judge, PLAGER, and SCHALL, Circuit Judges.

ARCHER, Chief Judge.

Wells Electronics, Inc. (Wells) appeals the judgment of the United States District Court for the Northern District of Texas, No. 3:91-CV-1542-H, involving U.S. Patent No. 4,491,377 ('377 patent) owned by Wayne K. Pfaff (Pfaff). The district court held that claims 1 and 6 of the '377 patent are invalid for anticipation, 35 U.S.C. § 102(b) (1994), that claims 7, 10, 11, and 19 are not invalid and that Wells' sockets infringed such claims. Wells appeals

the judgment as to infringement and validity. Pfaff cross-appeals the judgment of invalidity as to claims 1 and 6.

We hold that the invention disclosed in the '377 patent was on sale within the meaning of 35 U.S.C. § 102(b) or would have been obvious in view of that sale within the meaning of 35 U.S.C. §§ 102(b) and 103. Accordingly, the judgment of invalidity as to claims 1 and 6 is affirmed on other grounds and the validity judgment as to claims 7, 10, 11, and 19 is reversed.

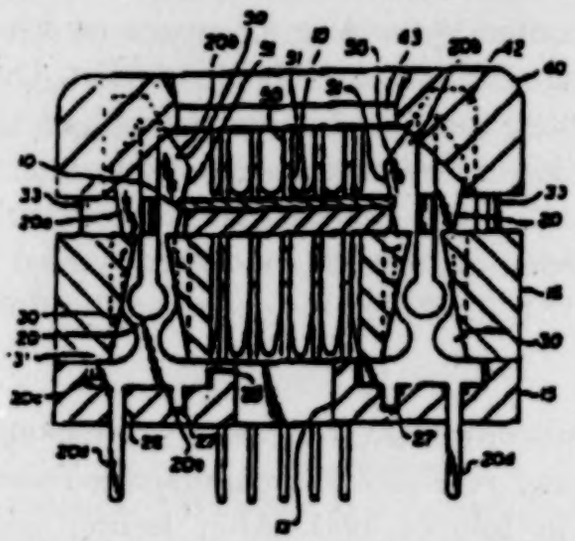
BACKGROUND

The '377 patent relates to sockets for testing leadless chip carriers. Claim 1 is representative and reads:

> 1. Mounting means for a leadless chip carrier comprising:
>
> (a) base support means having first and second oppositely disposed major faces;
>
> (b) a plurality of axially elongated conductive pins passing transversely through said base support means substantially perpendicular to said first and second major faces, the opposed inner edges of the ends of said pins extending from said first major face arranged to define a cavity substantially conforming to at least two oppositely disposed lateral peripheral dimensions of said leadless chip carrier in a plane parallel with said first major face and the inner edges of said pins converging slightly inwardly with distance from said first major face; and

> (c) unitary means operable independently of said leadless chip carrier reciprocally moveable axially with respect to said pins and coacting with said opposed inner edges of said pins for uniformly spreading the ends of said pins extending from said first major face to permit the insertion of a leadless chip carrier therebetween.

Figure 2 of the patent shows a sectional view of the socket:



The socket is comprised of three basic elements: a base support 15, a plurality of conductive pins 20, and a spreader 40. The chip carrier is placed in an opening in the spreader 40, which, when depressed, spreads apart the pins 20, by interaction of the lip 43 of the spreader 40 with the pins 20, to allow the carrier to fall into place between the pins 20 without applying any mechanical force to the carrier. When the spreader 40 is released, the pins 20 move back into their original positions, making

electrical contact with the carrier and locking it into place. In order to release the carrier, the spreader 40 is depressed, spreading the pins 20 and allowing the carrier to fall out through the opening in the spreader 40 when the socket is inverted.

In November 1980, Texas Instruments (TI) contacted Pfaff and asked him to develop a socket for its carriers. In a later meeting with TI representatives, Pfaff made a sketch of his concept and afterwards made detailed engineering drawings of the socket. Pfaff sent his drawings to a company called Weiss-Aug for customized tooling and production in February or March of 1981. On April 8, 1981, Delta V., a company acting on behalf of TI, issued a purchase order to Pfaff's company, Plastronics, for 30,100 sockets, which were intended for production use. The purchase order confirmed an earlier, verbal order on March 17, 1981. Pfaff filed his patent application on April 19, 1982.

Pfaff subcontracted the Delta V. socket order to Weiss-Aug and received the manufactured sockets from Weiss-Aug in July of 1981. After testing some of the sockets in a mechanical cycling machine that cycled them 72,000 times and finding no noticeable wear, the sockets were shipped to and accepted by TI.

This case is the second time Pfaff has sued Wells for infringement of the '377 patent. The first was appealed to this court and we upheld a finding of noninfringment and vacated the district court's holding that the patent was not invalid. *See Pfaff v. Wells Electronic, Inc.*, 884 F.2d 1399, 12 USPQ2d 1158 (Fed.Cir.1989) (Table).

Pfaff sued again after Wells modified its socket designs. The district court held on summary judgment that Wells' modified designs did not infringe the '377 patent. When that judgment was appealed to this court we reversed and remanded for further proceedings. *See Pfaff v. Wells Electronics, Inc.*, 5 F.3d 514, 28 USPQ2d 1119 (Fed.Cir.1993). On remand, the district court referred the case to a Special Master for a non-jury trial. The Special Master's Findings of Fact and Conclusions of Law were adopted by the district court as its opinion. The court held that claims 1 and 6 were invalid under 35 U.S.C. § 102(b) (1994) as being anticipated by a prior art reference. The court also held the claimed invention was not on sale within the meaning of § 102(b). Finally, the district court held that various models of Wells' sockets infringed the remaining claims. Both parties have appealed.

DISCUSSION

I. SECTION 102(b) ON-SALE BAR

Wells contends that claims 1, 6, 7, and 10[1] of the '377 patent are invalid because the invention claimed was on sale within the meaning of 35 U.S.C. § 102(b). That section provides that an inventor is not entitled to a patent if "the invention was . . . on sale in this country more than one year prior to the date of the application for patent in

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[1] Because claims 11 and 19 contain a barb element that, as discussed below, arguably was not in the device offered for sale, the validity of these claims depends on whether they would have been obvious in view of the prior art and what was offered for sale.

the United States." The ultimate determination of whether an invention was on sale within the meaning of § 102 is a question of law that we review *de novo*. *See Manville Sales Corp. v. Paramount Sys., Inc.*, 917 F.2d 544, 549, 16 USPQ2d 1587, 1591 (Fed.Cir.1990). We review the factual findings underlying the on-sale determination for clear error. *Id.* at 549, 917 F.2d 544, 16 USPQ2d at 1591. In this case, there are no facts in dispute, leaving only the legal issue of whether the § 102(b) on-sale bar invalidates the patent. *See UMC Electronics Co. v. United States*, 816 F.2d 647, 657, 2 USPQ2d 1465, 1472 (Fed.Cir.1987).

The relevant inquiry is whether there was a definite sale or offer for sale of the claimed invention prior to the critical date, defined as one year prior to the U.S. filing date to which the application was entitled. *See Envirotech Corp. v. Westech Eng'g Inc.*, 904 F.2d 1571, 1574, 15 USPQ2d 1230, 1232 (Fed.Cir.1990). The foremost purpose of the on-sale bar is to "prevent[ ] inventors from exploiting the commercial value of their inventions while deferring the beginning of the statutory term." *Ferag AG v. Quipp Inc.*, 45 F.3d 1562, 1567-68, 33 USPQ2d 1512, 1515 (Fed.Cir.1995). Thus, in making the determination as to whether the invention was "on sale," " '[a]ll of the circumstances surrounding the sale or offer to sell, including the stage of development of the invention and the nature of the invention, must be considered and weighed against the policies underlying section 102(b).' " *Micro Chem., Inc. v. Great Plains Chem. Co.*, 103 F.3d 1538, 1544, 41 USPQ2d 1238, 1243 (Fed.Cir.1997) (quoting *UMC*, 816 F.2d at 656, 2 USPQ2d at 1471-72).

The undisputed facts in this case show that the invention claimed in the '377 patent was commercialized

prior to the critical date of April 19, 1981. The district court found that a definite verbal and written purchase order for the later patented invention was received before the critical date. In a handwritten note on one of his engineering diagrams dated February 25, 1981, Pfaff indicated that the first order would be "for 500,000 springs (25,000 sockets)." On April 8, 1981, Pfaff's company received a written purchase order from Delta V. for 30,100 sockets for $91,155. The purchase order specified the materials to be used and the delivery date, and it noted that the order was a confirmation of a verbal order placed on March 17, 1981. *See Buildex Inc. v. Kason Indus.*, 849 F.2d 1461, 1464, 7 USPQ2d 1325, 1327-28 (Fed.Cir.1988) (holding the existence of a sales contract or the signing of a purchase order is sufficient to demonstrate "on-sale" status).

Additionally, Pfaff acknowledged in his testimony that, as a result of his meetings with TI, he had a "go" situation and that they had a "deal" prior to the critical date. Pfaff further admitted that the arrangement with TI was purely commercial, with no experimentation or additional development involved. *See UMC*, 816 F.2d at 657, 2 USPQ2d at 1472 ("Countering the prima facie case, UMC offers only the purely technical objection that no complete embodiment of the invention existed at the time of the sale. . . . However, the contract was not a research and development contract, and UMC admits that the offer it made was for profit, not to conduct experimental work."). Thus, there is no issue of experimental use in this case.

Although the invention was commercialized, it had not been reduced to practice at the time of sale because there was no physical embodiment of the invention. It

was for this reason alone that the district court did not apply the on-sale bar.

This court has held, however, that reduction to practice is not necessarily a prerequisite to application of the on-sale bar. *See UMC*, 816 F.2d at 656, 2 USPQ2d at 1471 ("[T]he on-sale bar does not necessarily turn on whether there was or was not a reduction to practice of the claimed invention."); *see also Petrolite Corp. v. Baker Hughes, Inc.*, 96 F.3d 1423, 1427, 40 USPQ2d 1201, 1204 (Fed.Cir.1996) ("[T]he thrust of the on-sale inquiry is whether the inventor thought he had a product which could be and was offered to customers, not whether he could prevail under the technicalities of reduction to practice. . . . " (quoting *Paragon Podiatry Lab., Inc. v. KLM Laboratories, Inc.*, 984 F.2d 1182, 1187 n. 5, 25 USPQ2d 1561, 1570 n. 5 (Fed.Cir.1993))).

Indeed, we have expressly rejected the notion that a physical embodiment is always required. *See Barmag Barmer Maschinenfabrik AG v. Murata Machinery, Ltd.*, 731 F.2d 831, 837, 221 USPQ 561, 565 (Fed.Cir.1984). In *Barmag*, we considered the Second Circuit's on-sale bar test as set out in *Timely Products Corp. v. Arron*, 523 F.2d 288, 302, 187 USPQ 257, 267-68 (2d Cir.1975), and departed from its restrictive approach. We noted that the *Timely Products* test was:

> that an offer to sell, without the existence of a physical embodiment of what is offered, does not start the running of the time period. It is not difficult to conceive of a situation where, because commercial benefits outside the allowed time have been great, the technical requisite of *Timely Products* for a physical embodiment, particularly for a simple product, would defeat the statutory policy and we, therefore, do not adopt the *Timely Products* test as the answer in all cases.

Barmag, 731 F.2d at 837, 221 USPQ at 565. Accordingly, the appropriate question is whether the invention was substantially complete at the time of sale such that there was "reason to expect that it would work for its intended purpose upon completion." *Micro Chem.*, 103 F.2d at 1545, 41 USPQ2d at 1244; *see UMC*, 816 F.2d at 657, 2 USPQ2d at 1472; *see also Robotic Vision Sys., Inc. v. View Eng'g, Inc.*, 112 F.3d 1163, 1167, 42 USPQ2d 1619, 1623 (Fed.Cir.1997) ("[A] sale or a definite offer to sell a substantially completed invention, with reason to expect that it would work for its intended purpose upon completion, suffices to generate a statutory bar." (quoting *Micro Chem.*, 103 F.3d at 1545, 41 USPQ2d at 1244)).

The undisputed facts show that Pfaff had completed engineering drawings accurately depicting the patented invention prior to the verbal purchase order of March 17, 1981, and the formal written order of April 8, 1981. These detailed drawings showed both precise dimensions and material requirements. According to the district court, these drawings "depict accurately the claimed invention and are very similar to the actual patent drawings used in the ['377] patent."

The only step not fully performed at the time of the sale was the customized tooling for manufacturing the invention. As the undisputed facts show, however, that step had already begun by the time of the sale. Around

February or March 1981, Pfaff sent his drawings to Weiss-Aug to prepare customized tooling and thereafter to "turnkey," or produce, the sockets in accordance with his normal business practice of going directly from the drawings to tooling and production without a prototype. This tooling was for production purposes and entailed making a stamping die, injection molds, customized rivets, and automated assembly equipment. Pfaff stated that the tooling process took five to six months in this particular case. The district court found that Weiss-Aug also produced at least one detailed fabrication diagram by March 31, 1981 and that Pfaff received the finished product in July of 1981.

The invention in this case is mechanical and there is no argument that it contains complicated components or involves a complex interaction of parts. The step of finishing the customized tooling was, therefore, routine and not a major step in the completion of an embodiment of the invention. Under all of the circumstances, including the completion of engineering drawings, the ordering of production tooling, and the commencement of fabrication of the tooling necessary to manufacture the invention for a specific customer, it is clear that more than a mere concept was on sale. The substantially completed socket had entered the production phase prior to the critical date and a specific purchase order was being filled.

Even though a prototype of the invention had not been built prior to the TI sale, the district court found that Pfaff was confident, based on his drawings, that this invention would work. Pfaff testified that it was his practice to produce his inventions without building any prototypes and that he had almost always been successful

with this approach. Indeed, that Pfaff expected his invention to work for its intended purpose is substantiated by the large sale to TI and the ordering of customized tooling.

Pfaff argues on appeal that the on-sale bar should not apply because no sockets had been tested prior to the critical date to ensure that the device would work. According to Pfaff's testimony, he feared that the pins would act as "a knife cutting through the cap." Given this concern, Pfaff contends that he could not have known that the invention would work prior to the 72,000 cycle test.

Testing, however, is not always necessary for the completion of an embodiment of an invention. *See Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1578, 38 USPQ2d 1288, 1291 (Fed.Cir.1996) (noting that "some inventions are so simple and their purpose and efficacy so obvious that their complete construction is sufficient to demonstrate workability"); *In re Asahi/America, Inc.*, 68 F.3d 442, 445, 37 USPQ2d 1204,1206 (Fed.Cir.1995) (same). Moreover, the invention need not "be in a commercially satisfactory stage of development." *Scott v. Finney*, 34 F.3d 1058, 1061-62, 32 USPQ2d 1115, 1118 (Fed.Cir.1994) (quoting *In re Dardick*, 496 F.2d 1234, 1238, 181 USPQ 834, 837 (CCPA 1974)).

By relying on the 72,000 cycle test, Pfaff did not show that he had doubts as to whether the socket would work for its intended purpose. The test was a fatigue test, not a functionality test, and only demonstrated that the socket

would work repeatedly under intensive use. Since durability was not a claimed requirement of the invention, the fatigue testing is irrelevant to the on-sale bar analysis.

Because durability is not a claimed or inherent aspect of the invention, Pfaff's reliance on *Seal-Flex, Inc. v. Athletic Track and Court Construction*, 98 F.3d 1318, 40 USPQ2d 1450 (Fed.Cir.1996), is inapposite. There, durability of the track surface was necessary to the efficacy of the invention. In contrast, the durability of the socket is not a requirement to the substantial completion of Pfaff's invention.

Pfaff also cites our decision in *Micro Chemical* to argue that his invention was not substantially complete. In *Micro Chemical*, however, a key part of the invention was missing entirely. At the time of the offer for sale, the inventor had made a prototype of a weighing system and a sketch of a mixing system, but he had not "designed the elements for isolating the weighing system" from the mixing system. *Micro Chem.*, 103 F.3d at 1544-45, 41 USPQ2d at 1243. The isolation means was not contained in the drawings or in the prototype of the weighing system. This critical part of the invention had not even been designed.

Pfaff also argues that the innovative nature of the invention weighs against the application of the on-sale bar. Pfaff appears to be suggesting that we should afford greater latitude under the on-sale bar to an innovative, or pioneer, patent, *see generally* 4 Donald S. Chisum, *Patents* § 18.04[2] (1996). Pfaff has not cited any authority or put

forth a persuasive reason for making such a differentiation in the on-sale bar context, assuming *arguendo* that this invention would be considered pioneering.

We have considered, but are not persuaded by, Pfaff's other arguments because we are satisfied that the evidence establishes that Pfaff's invention was substantially complete at least by the time of the pre-critical date offer to sell and receipt of the purchase order. For these reasons, we conclude that the invention of claims 1, 6, 7, and 10 was on-sale within the meaning of § 102(b) and that these claims are invalid.

II. SECTION 102(b)/103 ON-SALE BAR

As to the remaining claims, Pfaff argues that, even if the invention in claims 1, 6, 7, and 10 was on sale, claims 11 and 19 are distinguishable because these claims contain a barb element which is absent from the engineering diagrams. Claim 19 states:

> 19. Mounting means for a leadless chip carrier comprising:
>
> (a) a support housing having first and second oppositely disposed major faces;
>
> (b) a plurality of axially elongated contact means mounted within said support housing and extending therethrough with their axes aligned parallel to each other and normal to said first and second major faces, the free ends of said contact means extending from said first major face arranged to define a cavity rectangular in dimensions in a plane substantially parallel with said first major face, the ends of said contact means

defining said cavity having edges which incline inwardly toward said cavity in said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel with said first major face;

(c) spreader means comprising a substantially rectangular body arranged substantially parallel with said first major face and reciprocally moveable axially with respect to said contact means, said spreader means having a surface inclined with respect to the axes of said contact means and mating with the inclined inner edges of said contact means whereby movement of said spreader means axially with respect to said contact means in a first direction urges said free ends of said contact means outwardly with respect to said cavity; and

(d) *barb means projecting inwardly from the inwardly inclined edges of said contact means.*

(Emphasis added). Claim 11 depends from claim 7, invalidated above, and adds the limitation that "the inwardly inclined edges of said contact means include an inwardly projecting barb."

The on-sale bar is not limited solely to a sale of, or an offer to sell, a product that anticipates the later patented invention. It also applies if "the subject matter of the sale or offer to sell . . . would have rendered the claimed invention obvious by its addition to the prior art." *UMC*, 816 F.2d at 656, 2 USPQ2d at 1472. In effect, what was offered for sale before the critical date becomes "a [prior art] reference under section 103 against the claimed invention." *Baker Oil Tools v. Geo Vann, Inc.*, 828 F.2d 1558,

1563, 4 USPQ2d 1210, 1213 (Fed.Cir.1987). Because of the conjunctive use of sections 102(b) and 103, this bar has been called the § 102(b)/103 bar. *See LaBounty Mfg., Inc. v. United States Int'l Trade Comm'n*, 958 F.2d 1066, 1071 n. 3, 22 USPQ2d 1025, 1028 n. 3 (Fed.Cir.1992); *In re Corcoran*, 640 F.2d 1331, 1333, 208 USPQ 867, 869 (CCPA 1981).

Because both on-sale and obviousness determinations are questions of law that we review *de novo*, *see Manville Sales Corp.*, 917 F.2d at 549, 16 USPQ2d at 1591; *B.F. Goodrich Co. v. Aircraft Breaking Systems Corp.*, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1317 (Fed.Cir.1996), the ultimate determination of obviousness under the § 102(b)/103 bar is necessarily also a question of law subject to *de novo* review. *Cf. Ferag*, 45 F.3d at 1566, 33 USPQ2d at 1514; *Envirotech*, 904 F.2d at 1574, 15 USPQ2d at 1232 (both discussing obviousness under on-sale bar rubric and noting on-sale determination is a question of law).

We review the factual determinations underlying the § 102(b)/103 obviousness determination for clear error. *See KeyStone Retaining Wall Sys., Inc. v. Westrock, Inc.*, 997 F.2d 1444, 1451-52, 27 USPQ2d 1297, 1303 (Fed.Cir.1993); *cf. Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1568-69, 1 USPQ2d 1593, 1597-98 (Fed.Cir.1987); *Manville Sales Corp.*, 917 F.2d at 549, 16 USPQ2d at 1591. A finding of fact is clearly erroneous when, "although there is evidence to support it, the reviewing court is left with the definite and firm conviction that a mistake has been committed." *Buildex*, 849 F.2d at 1464, 7 USPQ2d at 1328 (citing *Anderson v. City of Bessemer City*, 470 U.S. 564, 573, 105 S.Ct. 1504, 84 L.Ed.2d 518 (1985)). In any obviousness determination, the following factors are relevant: the

scope and content of the prior art, the differences between the prior art and the claims, the level of ordinary skill in the art at the time of the invention, and objective evidence of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693-94, 15 L.Ed.2d 545 (1966).

Figure 4 from the '377 patent illustrates the barb element (51a) at issue.

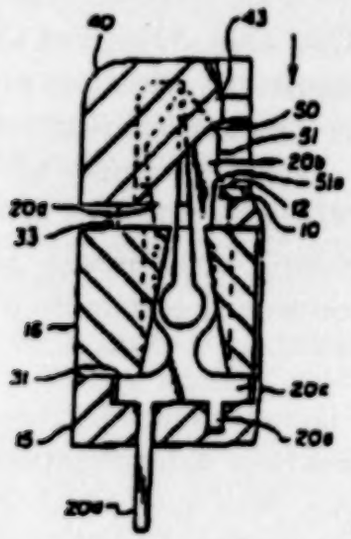


Fig. 4

According to the written description, the "barb" is used to "scrape the surface of the lands 11 to remove any oxidation therefrom and thus form good electrical contact with the lands 11 while also acting to retain the leadless chip carrier within the cavity." Col. 5, line 66 to col. 6, line 2. The barb is the only element arguably missing from what was offered for sale.

The district court evaluated the obviousness of the barb element in the context of § 103 and held that the barbs were not taught in the prior art and, thus, were not obvious. In reaching this conclusion, the district court summarily determined that the "AMP references" and the "TO-5 Contactor" reference did not teach the use of barbs.[2] The court, however, failed to evaluate two of the AMP references presented by Wells: U.S. Patent No. 4,262,984, issued to Takahashi (Takahashi) on July 19, 1979, and U.S. Patent No. 3,216,580, issued to Fricker (Fricker) on November 9, 1965. Review of these references convinces us that the district court clearly erred in determining that the barb element was not taught in the prior art.

Takahashi discloses an electric contact terminal member. The terminal member has a temporary holding slot to hold an electrical cable before it is pressed into the conductor slot in which electrical contact is made. The inside surfaces of the terminal "arms 5b have opposed temporary holding projections 5c which project into the cable holding slot 5e, to temporarily hold the cable 4a in the cable holding slot 5e," as shown in Figure 2 from the patent.

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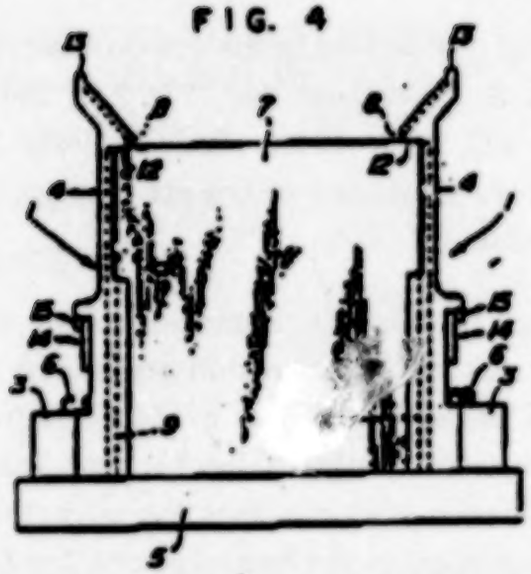
[2] The district court seemingly based its § 103 nonobviousness determination primarily on its view that "[n]o combination of prior art suggested by Wells teaches all of the limitations in claims 11 and 19." In the context of a § 103 obviousness determination, this conclusion may be correct. Here, however, the only element not on sale was the barb.

FIG.2
(A)



Likewise, Fricker discloses a support device for retaining card-like devices in a base. Fricker notes that "the card element 7 may be a printed circuit carrying card which is inserted into a multiple contact plug in base 5." In order to hold the card in place, "the upper member 2 may project over the top of card 7 in a fully inserted position. In this case, the bottom edge 12 of member 2 would bear against the top edge of card 7," as shown in Figure 4 of the patent.

FIG. 4



Both pieces of prior art teach using a barb-like element to hold the desired object into place. Additionally, both consider uses in electrical settings, and Fricker particularly notes the use of the barb element to hold the object in a position to maintain electrical contact. Similarly, the barb in the Pfaff patent is used to hold the carrier in place, even though it also scrapes oxidation from the carrier and provides electrical contact. Notwithstanding these additional features, the teachings of Fricker and Takahashi thus provide sufficient motivation to combine the barb-like element in the prior art with what was offered for sale to yield the invention in claims 11 and 19. *See In re Kemps*, 97 F.3d 1427, 1430, 40 USPQ2d 1309, 1311 (Fed.Cir.1996) (noting motivation to combine in prior art need not be identical to that of applicant) (citing *In re Dillon*, 919 F.2d 688, 693, 16 USPQ2d 1897, 1901 (Fed.Cir.1990) (in banc)).

Unrebutted expert testimony also demonstrates that the motivation to combine the prior art to lock an object in place with barb elements would be provided by the

knowledge of one skilled in the art. *See Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 2871, 297 n. 24, 227 USPQ 657, 667 n. 24 (Fed.Cir.1985) (noting that knowledge of one skilled in the art may provide motivation to combine).

Although the district court determined that the commercial success of the invention supported a finding of nonobvious under § 103, this evidence is insufficient to rebut the clear teachings of Fricker and Takahashi. Further, no evidence suggests that the socket's commercial success was related to the barb element. *See Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1539, 218 USPQ 871, 879 (Fed.Cir.1983) (requiring nexus between merits of invention and evidence of secondary considerations).

Accordingly, we conclude that the invention of claims 11 and 19 would have been obvious in light of the prior art and the socket that was on sale. These claims are, therefore, invalid under § 102(b)/103.

CONCLUSION

Because all of the claims at issue are invalid, we need not reach the other issues raised in the appeal and cross-appeal.

AFFIRMED-IN-PART AND REVERSED-IN-PART.

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
DALLAS DIVISION

WAYNE K. PFAFF, Plaintiff, v. WELLS ELECTRONICS, INC. Defendant.	§ § § § § § § § §	Civil Action No. 3:91-CV-1542-H (Filed Dec. 29, 1995)

FINAL JUDGMENT ON LIABILITY

The above case was tried without a jury on the bifurcated issue of liability before a Special Master pursuant to Fed.R.Civ.P.53. The Special Master determined all liability issues regarding any infringement of United States Patent No. 4,491,377 by Defendant Wells Electronics, Inc., as well as any issues regarding the invalidity of the patent-in-suit. Only Claims 1, 6, 7, 10, 11 and 19 were at issue. After adoption on October 25, 1995, of the REPORT AND FINDINGS OF FACT AND CONCLUSIONS OF LAW OF THE SPECIAL MASTER, the Court hereby expressly determines that there is no just reason for delay and directs entry of the following JUDGMENT on the issue of liability:

1. Claims 1 and 6 of U.S. Patent No. 4,491,377 are invalid, and thus are not infringed by any of the Wells socket devices.

2. Claims 7, 10, 11 and 19 of U.S. Patent No. 4,491,377 are not invalid.

3. The Wells Model No. 647 device infringes Claims 7 and 10, but does not infringe Claims 11 or 19.

4. The Wells Model No. 653 device infringes Claims 7, 10 and 11, but does not infringe Claim 19.

5. The Wells Model No. 667 device infringes Claims 7 and 10, but does not infringe Claims 11 or 19.

6. The Wells Model No. 668 device as shown in Plaintiff's Exhibit 179 infringes Claims 7 and 10, but does not infringe Claims 11 or 19. The remaining embodiments of the Wells Model No. 668 devices do not infringe Claims 7, 10, 11, or 19.

7. The Wells Model Nos. 642, 648, 649, 652 and 663 devices do not infringe Claims 7, 10, 11 or 19.

The bifurcated issue of damages is STAYED pending disposition of all appeals regarding the issues of infringement and validity.

SIGNED this 29 day of December, 1995.

/s/ Barefoot Sanders
BAREFOOT SANDERS, JUDGE
UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF TEXAS

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF TEXAS
DALLAS DIVISION

WAYNE K. PFAFF, *Plaintiff,* v. WELLS ELECTRONICS, INC., *Defendant.*	§ § § § § § §	Civil Action No. 3-91-CV-1542-H (Filed Oct. 19, 1995)

REPORT AND FINDINGS OF FACT AND CONCLUSIONS OF LAW OF SPECIAL MASTER

This report of the Special Master is submitted pursuant to Fed. R. Civ. P. 53(e)(1) on October 19, 1995. It has been prepared following a hearing before Judge Sanders on August 23, 1995. At the end of this hearing, Judge Sanders made a number of rulings with instructions to the Special Master to modify the definition of "axially elongated" appearing in Section 5b. of this report. The second instruction resulted in the addition of two new Sections 5m. and 6d. directed to the word "rectangular" contained in the patent claims.

The Special Master prepared a number of draft reports and submitted them to the parties for their comments before submitting a final report to Judge Sanders. Following each draft submission, modifications were made by the Special Master. These drafts and modifications are summarized briefly below. A draft report with findings only with respect to the issues of infringement was submitted to the parties on October 24, 1994. Both parties replied with comments some of which resulted in

changes to the infringement portion of this report. A second draft adding patent validity issues was submitted to the parties on March 2, 1995. Both parties responded on April 3, 1995 with comments. Substantive changes were made in this report in Sections 5b., 5e. and 10d. in response to the parties comments and recent Federal Circuit decisions, particularly the *Comair* case cited in Section 5b. These substantive changes were incorporated in a third draft report of the Special Master filed on May 10, 1995 with the clerk who distributed it to the parties. The defendant submitted a full English translation of Japanese patent application Exhibit ALA, and both parties submitted comments on the third draft report. Substantive changes were made to Section 10c. regarding the Japanese patent application and incorporated in a final report submitted on July 3, 1995. Both parties filed objections to the final report and Judge Sanders held a hearing on August 23, 1995. Judge Sanders instructed the Special Master to make the two modifications identified above and indicated that the report would then be adopted without further argument or hearing.

The patent infringement issues and one new prior art validity issue regarding the Japanese patent application were tried before the Special Master in this court on July 5-8, 1994 without a jury. The other validity issues were tried before the United States District Court for the Northern District of Indiana (Indiana Court) on July 18-20, 1988 without a jury. By stipulation of the parties in this case, the transcript and exhibits in the Indiana Court form the basis for the findings in this court with regard to the other validity issues. The issue of patent damages has

been bifurcated and discovery stayed until final determination of the liability issues.

The plaintiff in this suit, Wayne K. Pfaff, is an individual residing in Irving, Texas. The defendant is Wells Electronics, Inc., an Indiana Corporation, having its principal place of business in South Bend, Indiana. This court has jurisdiction of the subject matter of this action pursuant to 28 U.S.C. § 1338(a) and 35 U.S.C. § 281. Venue in this court is proper pursuant to 28 U.S.C. § 1391(c) and § 1400(b).

1. Prior Proceedings

Plaintiff, Pfaff, sued Defendant, Wells, in the Indiana Court alleging that two of Wells' devices[1] infringed on Plaintiff Pfaff's patent 4,491,377 ("Pfaff patent"). Pfaff asserted that claims 1 and 6-10 of its patents were infringed by the two Wells devices. The Indiana Court found that the Pfaff patent was not infringed by the two Wells devices, and that the patent was not invalid.[2] The Court of Appeals for the Federal Circuit affirmed the Indiana Court's decision of non-infringement rendering "moot Wells' cross-appeal on invalidity" in accordance with the Court of Appeals for the Federal Circuit procedure at that time.[3]

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[1] Defendant Exhibits C-1 and C-2.

[2] *Pfaff v. Wells Electronics, Inc.*, 9 USPQ2d 1366 (N.D. Ind. 1988).

[3] *Pfaff v. Wells Electronics, Inc.*, 12 USPQ2d 1158 (Fed. Cir. 1989).

Pfaff is now suing Wells in this case for infringement of the same patent, on six other Wells devices developed subsequent to the Indiana Court's decision.[4] Wells contends that the patent is not infringed, and once again that the patent is invalid, adding one additional piece of prior art, the Japanese patent application, that was not before the Indiana Court.

In this case, Wells filed a Motion for Summary Judgment that none of the six accused devices infringed the asserted claims 1, 6, 7, 10, 11 and 19 of the Pfaff patent. This court granted Wells' Motion for Summary Judgment, and the Court of Appeals for the Federal Circuit reversed and remanded for further proceedings.[5]

2. Invention in the Pfaff Patent

The patented invention is a socket for testing leadless chip carriers. A leadless chip carrier is a surface mountable circuit device package containing a semiconductor chip carrier and may take many geometric forms.[6] The computer chip carrier can be inserted into a socket for testing and thereafter removed from the socket. The Pfaff

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[4] Defendant Exhibits D-1 through D-6.

[5] *Pfaff v. Wells Electronics, Inc.* 5 F.3d 514, 28 USPQ2d 1119 (Fed. Cir. 1993).

[6] "Some leaderless [sic] chip carriers actually have small J-type leads that wrap around the edge of the carrier and are adapted for surface mounting of the carrier on a printed circuit board rather than insertion through the circuit board. More precisely, 'leaderless chip carrier' is a term of art designating a surface-mountable chip carrier." *Pfaff v. Wells Electronics, Inc.* 9 USPQ2d at 1367, n.1 (N.D. Ind. 1988).

patent invention is referred to as a "zero insertion force" socket since the chip carrier is inserted into operative position without applying any force to the chip carrier itself. The socket has pins or contacts to make electrical connection to the chip carrier. The pins can be opened and closed so that the chip carrier can be inserted and removed merely by pressing and releasing a cap-type spreader.

The socket of the invention contains three basic elements: a base support; a plurality of conductive pins; and a cap or "spreader".

The socket of the Pfaff patent generally operates as follows:

(1) A computer chip carrier is positioned within the rectangular opening in the top or lid;

(2) The lid is pressed downward;

(3) The lid presses against the pins to spread the pins slightly, thereby allowing the chip carrier to fall into its proper, secured, operating position; and

(4) The lid is released, allowing the lid and the pins to spring back toward their original positions.

To remove the computer chip carrier:

(1) The socket is inverted;

(2) The lid is pressed, thereby spreading the pins and releasing the computer chip carrier from its secured position; and

(3) The computer chip carrier simply falls out of the socket.

A feature of the Pfaff patent is using a unitary cap to uniformly spread the ends of the pins by contact with the inner edges of the pins. The pins are axially elongated and cooperate with the cap to allow spreading. The pins spread to the open position to avoid damage to either the chip carrier or pins during insertion or removal of the chip carrier.

In order to operate properly, the pins contact the chip carrier in a manner to secure it in place during testing. To accomplish this, the pins have a converging inner edge portion which, in the closed position, secures the carrier in place.

The basic elements of the Pfaff patent invention are shown in Figure 2 of the Pfaff patent.[7] Element 15 is the base support; element 16 is the intermediate housing support; elements 20 are the conductive pins; and element 40 is the lid or spreader.

The conductive pins define a central cavity into which the computer chip carrier is inserted. The pins may include a barb 51a, outwardly diverging edges 50, inwardly inclining edges 51, base 20c, stud 20e, shank 20d and a curved portion (not numbered) adjacent to the base (Figures 4 and 5, Column 5, Lines 56 through Column 6, Line 2).

Operation of one embodiment of the invention is illustrated in Figures 4 and 5 of the patent shown below.

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[7] U.S. Patent 4,491,337, Plaintiff Exhibit 3.

Figures 4 and 5 of Pfaff Patent 4,491,377

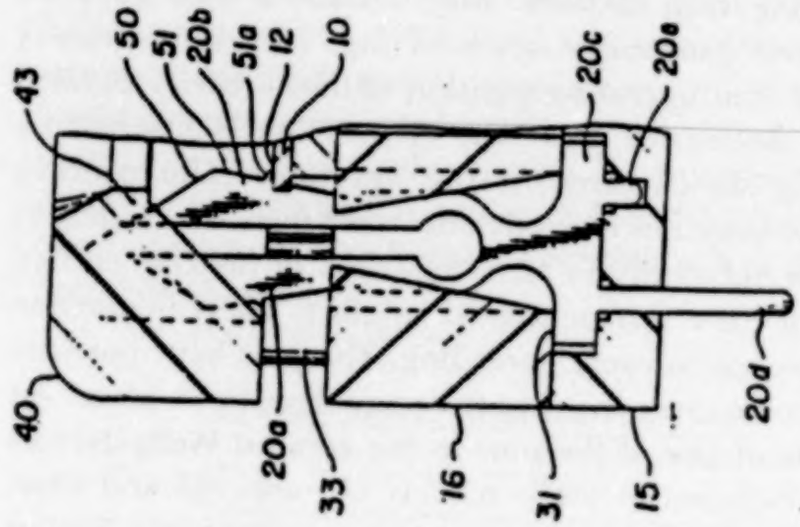


Fig. 5

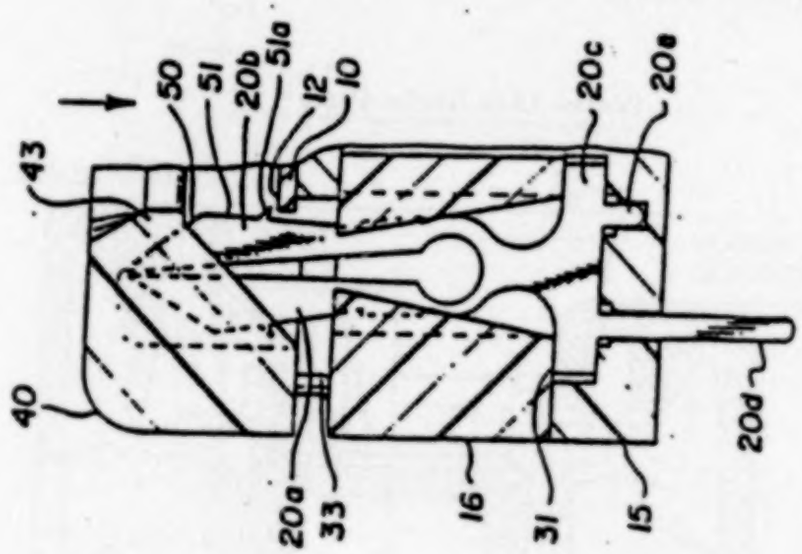
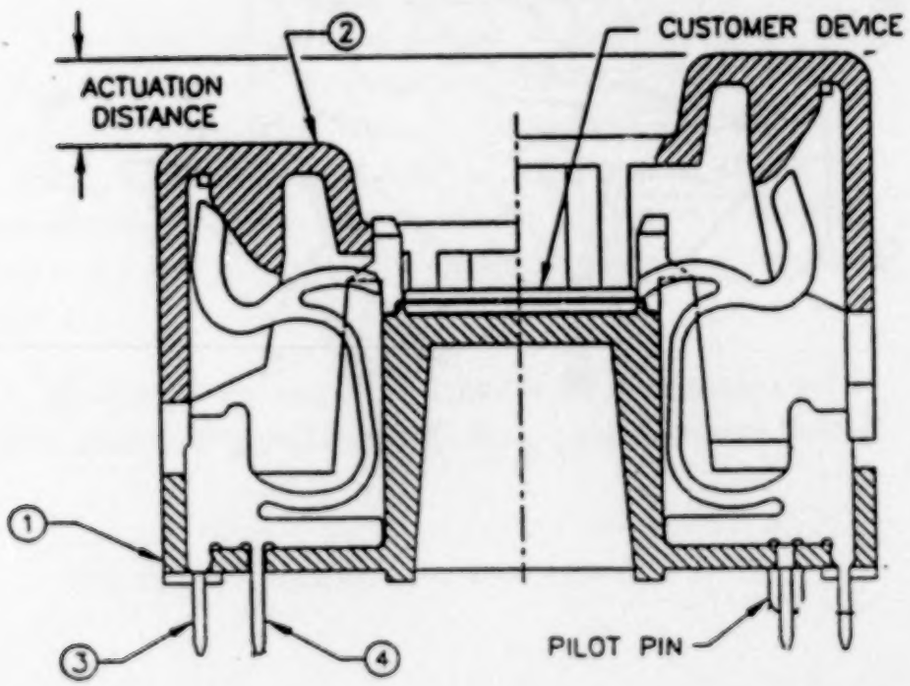


Fig. 4

3. Wells Accused Sockets

The accused Wells sockets are housings or mountings for testing chip carriers. They include a base support, conductive pins and a spreader cap. The chip carrier is inserted into operative position within a cavity defined by the conductive pins. The chip carrier is inserted by pressing downward on the spreader. The unitary spreader provides a positive outward force which pushes the pins outwardly to allow insertion of the chip carrier. The pins have sufficient axial length to allow interaction with the cap to cause spreading. The pins have portions which move over the chip to secure the chip in place. An example of one of the pins in the accused Wells devices which is found in Wells models 653 and 663 and illustrated in Defendant's Exhibit D-2 and Plaintiff's Exhibit 175 is shown below.

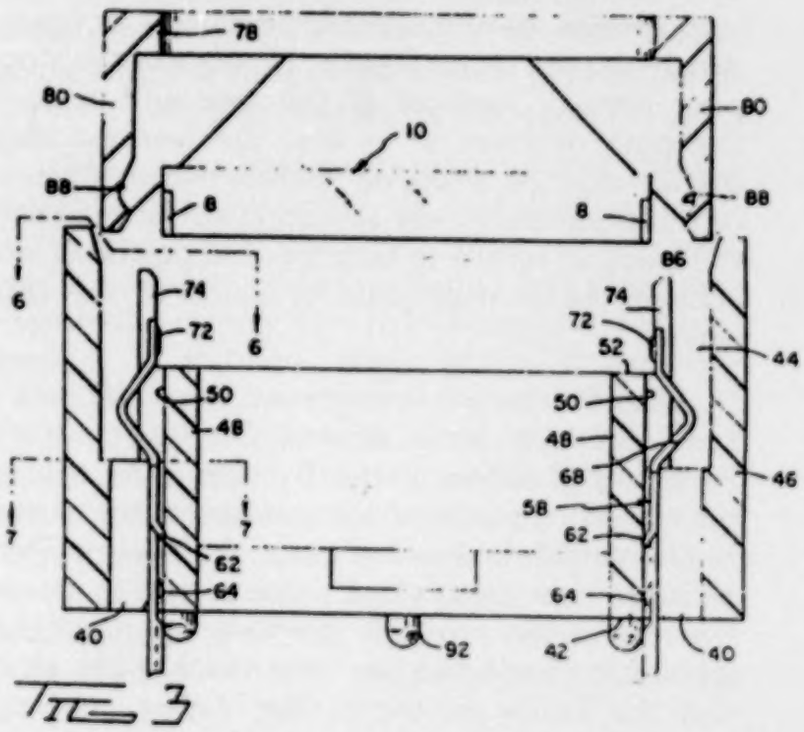
Wells D-2 Style Pins



4. Prosecution History of the Pfaff Patent

The Pfaff patent 4,491,377 was filed in the United States Patent and Trademark Office on April 19, 1982 and issued on January 1, 1985. There were two Office Actions rejecting the Pfaff patent application and five United States patents were cited as prior art against the Pfaff patent.[8] In the first Office Action, the Examiner rejected claims 1, 6, 7, 10 and 11 under 35 U.S.C. 102(b) as being clearly anticipated by Pauza, et al.[9] Figure 3 of the Pauza patent is shown below.

Pauza Patent Cited As Prior Art



[8] For prosecution history, see Defendant Exhibit B.

[9] U.S. Patent No. 3,753,211, Defendant Exhibit ABC.

Pfaff's patent attorney argued that the Pfaff invention was different from the Pauza reference. In the remarks responding to the Examiner's first Office Action, Pfaff's attorney described the invention.

> . . . Zero insertion force sockets for burn-in boards are even more advantageous since they permit automated mechanized loading of the socket with no pressure (other than gravity) ever being applied to the carrier itself. This is accomplished in the invention as claimed by providing a camming surface on the interior surface of the pins coacting with reciprocally moveable spreading means which has an aperture therein larger than the periphery of the chip carrier. As the spreader means is independently moved downwardly, it contacts the slopping interior surfaces of the pins and spreads the pins outwardly so that the leadless chip carrier may be dropped therebetween. Release of the pressure on the camming surface permits the leads to return to their normal positions and contact the contact pads or lands of the chip carrier.

The Pauza, et al reference is clearly not a zero insertion force device. On the contrary, Pauza, et al shows vertically extending contact pins which contact the outer edges of the carrier as the carrier is inserted into the socket. Thus pressure must be applied to the carrier to spread the contact pin arms 70. It will be apparent that contact is made between the contact pin at 72 and the lands on the carrier *during insertion*. Thus pressure must be applied to the carrier to insert the carrier into the socket. The closure lid operates on the knee 69 of the contact pin to cause the contact area 72 of the pin to move

vertically and thereby wipe the contact pad on the carrier to assure uniform electrical conduct. However, it is quite clear that Pauza, et al disclose no means other than the chip carrier itself to spread the contact pins of the socket.

Claim 1 (as originally written) included such language as "the inner edges of said pins converging slightly inwardly with distance from said first major face" and "means for uniformly spreading the ends of said pins extending from said major face to permit the insertion of a leadless chip carrier therebetween." Pauza, et al clearly fail to show or remotely suggest any such structure. The closure lid of Pauza, et al does not provide means for spreading the ends of the pins. Instead, Pauza, et al provide means for moving the ends of the contact pins *vertically* to rub or wipe the lands on the carrier.

> Claim 1 (as now amended) includes "means operable independently of said leadless chip carrier and coacting with the *inner edges* of said pins" (emphasis added). Claim 1 has thus been amended to clearly note that the spreader means operates on the *inner* edges of the pin (as contrasted to the outer edge as shown in Pauza, et al). It is respectfully submitted, therefore, that the structure defined by claim 1 is wholly foreign to the structure disclosed by Pauza, et al. Likewise, claim 7 has been amended to note that the spreader means meets with the inclined *inner* edges of the contact means rather than the outer edges of the contact means as disclosed by Pauza, et al.[10]

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[10] Claims 1 and 7 as issued in the Pfaff patent are presented below. Pending claims 1 and 7 kept their same numbers when

There can be no ambiguity after referring to the Pauza pin 58 shown in Figure 3 above, determining

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issued, but were amended during the prosecution of the Pfaff patent.

1. Mounting means for a leadless chip carrier comprising:

(a) base support means having first and second oppositely disposed major faces;

(b) a plurality of axially elongated conductive pins passing transversely through said base support means substantially perpendicular to said first and second major faces, the opposed inner edges of the ends of said pins extending from said first major face arranged to define a cavity substantially conforming to at least two oppositely disposed lateral peripheral dimensions of said leadless chip carrier in a plane parallel with said first major face and the inner edges of said pins converging slightly inwardly with distance from said first major face; and

(c) unitary means operable independently of said leadless chip carrier reciprocally moveable axially with respect to said pins and coacting with said opposed inner edges of said pins for uniformly spreading the ends of said pins extending from said first major face to permit the insertion of a leadless chip carrier therebetween.

7. Mounting means for a leadless chip carrier comprising:

(a) a support housing having first and second oppositely disposed major faces;

(b) a plurality of axially elongated contact means mounted within said support housing and extending therethrough with their axes aligned parallel to each other and normal to said first and second major faces, the free ends of said contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimensions in a plane substantially parallel with said first major face, the ends of said contact means defining said cavity having edges which incline inwardly toward said cavity in

which edge is the outer edge, or which is the inner edge. Clearly the lower ends of the flanges 80 on the closure lid operate on the outside edge of the knee 69 of the contact pin 58 to push it toward the center of the Pauza device containing the chip carrier. It is just as clear that the inner edge of the Pauza pin 58 is the side facing the chip carrier. The language inserted into the claim by Pfaff's attorney in response to the Examiner's first Office Action rejection, simply defined which side of the pin made contact with the camming surface of the spreader cap in the Pfaff invention. In Figures 4 and 5 of the Pfaff patent shown above this would be the right side of the pin 20.

In the second Office Action, the Examiner once again rejected claims 1 and 7 under 35 U.S.C. 102(b) as being anticipated by Anhalt.[11] Anhalt zero insertion force connector is illustrated in Figure 2 of the Anhalt patent below.

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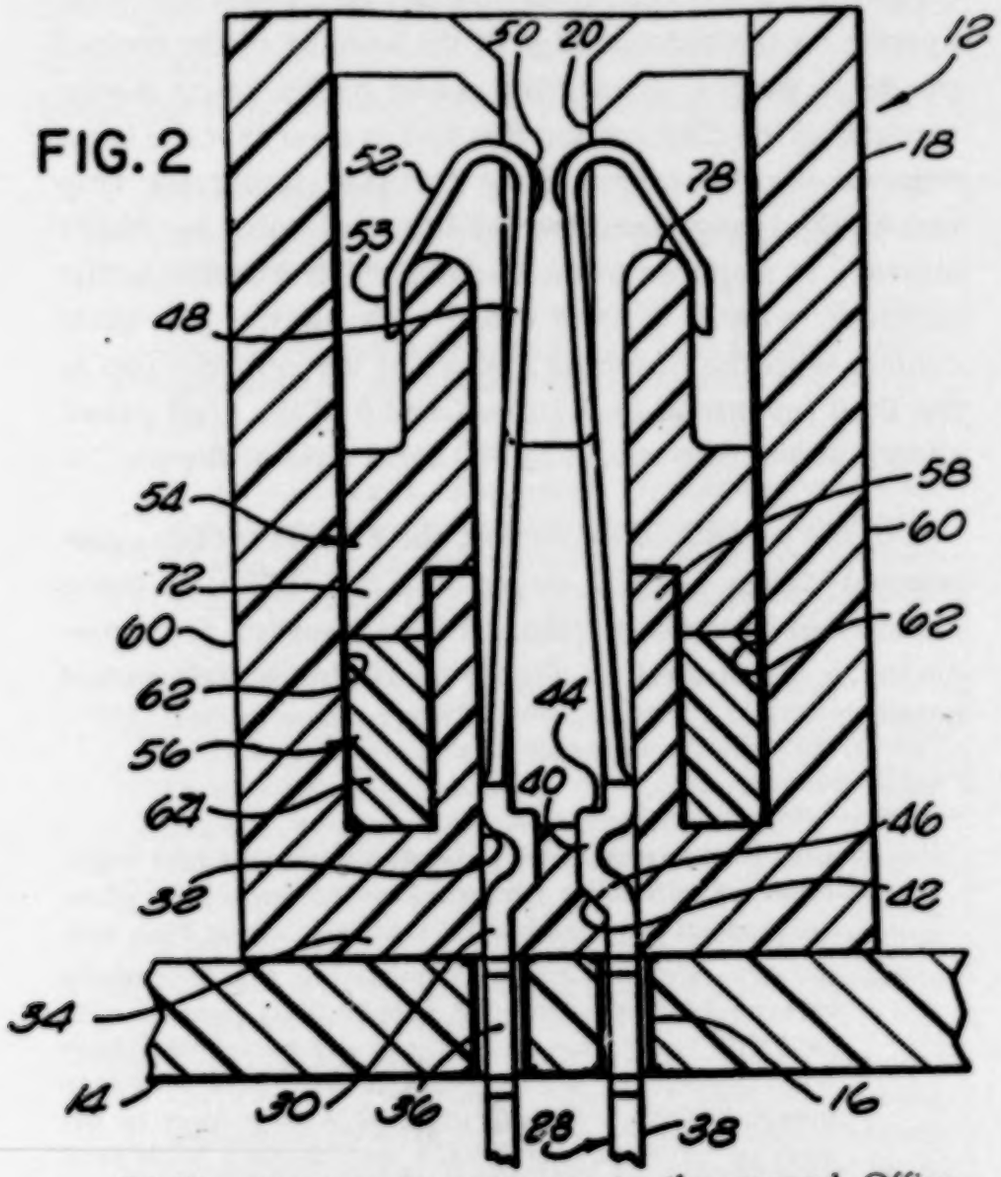
said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel with said first major face; and

(c) unitary spreader means comprising a substantially rectangular body arranged substantially parallel with said first major face and reciprocally moveable axially with respect to said contact means, said spreader means having a surface inclined with respect to the axes of said contact means and mating with said inclined inner edges of said contact means whereby movement of said spreader means axially with respect to said contact means in a first direction urges said free ends of said contact means outwardly with respect to said cavity.

[11] Anhalt Patent 4,159,861, Defendant Exhibit ABF.

Anhalt Patent Cited As Prior Art

FIG. 2



Pfaff's attorney, in response to the second Office Action, further amended claim 1 by adding the words "opposed inner edges of the" in paragraph (b) of claim 1. In the remarks responding to the second Office Action,

Pfaff's patent attorney distinguishes over the Anhalt patent.

> . . . This reference discloses a socket for a circuit board or the like. The Anhalt device is a zero insertion force socket with normally closed contacts. The contact arms extend upwardly through a base support and are biased toward each other to firmly grasp the lands on a circuit board inserted therebetween. The free ends of the contacts are rolled outwardly and downwardly to form a camming surface spaced *outwardly* from the contacting surface. An internally mounted pair of spreaders 54 reciprocate axially with respect to the contact means to engage the outwardly sloping remote ends of the contact means and to thus spread the contacts.
>
> Note that the spread means 54, while moving coaxially with the contact means, is formed by an *unconnected pair* of vertically moveable members. Furthermore, each is internally mounted and has camming surfaces on its underside which coact with mating camming surfaces on a laterally or radially moving (with respect to the contact means) cam shift which, in turn, is connected to a cam shift lever 84.
>
> The invention as defined in applicant's claim 1 similarly has a plurality of pins extending from a base support plate which are biased to a normally closed position. However, the similarity between applicant's invention and the reference ends there. In applicant's device, the spreader means is a *unitary means* moveable axially with respect to the contact pins but with only a single camming surface. This camming surface mates with the *opposing inner edges* of the

contact means (see paragraphs (b) and (c) of claim 1) rather than folding over outer edges as shown in the reference. Furthermore, applicant's device specifically defines a *unitary* spreader. In other words, instead of a pair of spreaders activated by a pair of mating cams activated by a actuating lever (five different complicated parts interconnected by a pin), applicant's device uses a *single unitary* part radically simplifying the design and cost of manufacture. The unitary design also greatly improves reliability since it has only one moving part as contrasted to six interrelated moving parts in the reference. By using the unitary design of applicant's invention and adapting the spreader camming surface to mate with the *internal* edges of the contact pins (rather than the *external* edges as in the reference), a completely different mode of operation is produced.

It is respectfully submitted that since claim 1, as now presented, specifically defines a *unitary* spreader which coacts with the *inner edges* of the contact pins defining the cavity in which the chip carrier is mounted, the claims specifically and distinctly defines structure neither shown nor even remotely suggested by the Anhalt reference. Claim 6 is directly dependent from claim 1 and thus includes all the limitations thereof. Accordingly, it is respectfully submitted that claims 1 and 6 are clearly patentable over Anhalt for the reasons set forth here and above.

Claim 7 (the only other independent claim) has also been amended to specifically recite that the contact means are arranged with their *inner* edges defining a rectangular cavity and that a

unitary spreader means having an inclined surface mates with the inclined *inner edges* of the contact means to spread the contacts. As pointed out hereinabove with respect to claim 1, the Anhalt reference does not show a *unitary* spreader means. Instead, the Anhalt spreader comprises five different parts interconnected by a connecting pin and *does not coact with the inner edges*. Instead, it cams against the *outer edges* of the pins. Accordingly, it is respectfully submitted that claim 7 defines structure which is neither shown nor suggested by Anhalt and which operates in a mode quite differently from Anhalt. It is therefore respectfully submitted that claim 7 is likewise patentable over Anhalt for the reasons set forth hereinabove.

Once again, Pfaff's patent attorney is attempting to define through amendment the difference between the spreader coacting with the inner edge of the pin as opposed to the outer edge of the pin. The Anhalt reference is a little more complex than the Pauza reference, but nevertheless presents no difficulty in identifying which edges of the Anhalt contact pin 48 is the inner edge and which is the outer edge. Clearly, the edge of the Anhalt pin 48 which contacts the circuit board is the inner edge. The other side of the Anhalt pin 48 is the outer edge. The upper portion of the pin 48 is bent over so that in the region of arm 52 the outer edge of the pin 48 faces inwardly toward the circuit board. Carrying this claim language as presented to the United States Patent and Trademark Office by Pfaff's patent attorney to its logical end, the inner edge of the Anhalt pin 48 meets the outer edge of the pin 48 at the termination of the arm 52 in end section 53. Using the explanation given by Pfaff's patent

attorney in the remarks responding to both the second Office Action and the first Office Action, it is clear that the camming surface of the means for retracting the contact pins 48 designated 54 in Figure 2 of the Anhalt patent meets with the outer edge of the pin 54. Since the camming member 54 is moving up from the bottom of the pin 48 in Anhalt, it moves the pin 48 outward away from the circuit board. In the Pauza patent reference, the cam or flange 80 moves downward contacting the outer edge of the Pauza pin 58 to force the pin inward. In each case, Pauza and Anhalt, the references show a camming action cooperating with the outside edge of the contact pins. This has been distinguished from the Pfaff invention where the claims were amended to call for the spreader cap to engage the inner edge of the pin 20.

The Examiner then allowed claims 1 and 7 as well as other claims pending in the Pfaff patent application at that time.

Pfaff's patent attorney also amended paragraph (b) of claim 1 to insert the words "axially elongated" in the first line. No mention was made in the remarks concerning "axially elongated". Claim 7 as originally filed already had the words "axially elongated" included in its paragraph (b).

INFRINGEMENT

5. Literal Infringement

Patent infringement analysis requires a two-step inquiry: a threshold question of claim interpretation, followed by a determination of whether the properly interpreted claims encompass the accused structure. *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 988 F.2d 1165, 126 USPQ2d 1018 (Fed. Cir. 1993). The first inquiry is a question of law, and the second is a question of fact. *Minnesota Mining and Mfg. Co. v. Johnson and Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992).

To establish infringement of a patent, every limitation set forth in a claim must be found in an accused product or process exactly (literal infringement) or by a substantial equivalent (the doctrine of equivalents) *Johnson v. IVAC Corp.*, 885 F.2d 1574, 12 USPQ2d 1382 (Fed. Cir. 1989). Claim interpretation involves a review of the claim language, the specification, the prosecution history, and, if necessary, extrinsic evidence, such as expert testimony. *Texas Instruments, Inc. v. United States Int'l Trade Comm'n*, 988 F.2d 1165, 26 USPQ2d 1018 (Fed. Cir. 1993).

Pfaff has alleged that six types of burn-in sockets made by Wells infringed claims 1, 6, 7, 10, 11 and 19 of the Pfaff patent. The structure and operation of the six accused Wells socket types generally represented by Defendant's Exhibits D-1 through D-6 are shown in detail by the following exhibits, drawings, specimens and models:

TABLE X – SIX ACCUSED WELLS SOCKET TYPES

Exhibit No.	Wells Model No.	Wells Drawing No.	Plaintiff's Exhibit No.
D-1 (PX 59)	642	642-126XXXX	150
		031-045-XXX	151
		031-050-XXX	152
		Catalog Page No. 25	153
		Specimen	119 117 (enlarged)
		Sample Pin Model	118 120
D-2 (PX 60)	653	1071XXX	170
		1072XXX	171
		Catalog Page No. 3	173
		Specimen	174 121 (enlarged)
		Sample Pin Model	122 124
D-2	663	663-240XXXX	175
	653	653-12818X1-100	184
		Specimen	123
	663	648-0322011	157
D-3 (PX 61)	648	001-XXX-004 (Sheet 2)	158
		Catalog Page No. 9	159
		Specimen	127 125 (enlarged)

		Sample Pin	126
		Model	128
D-3	649	649A0262011-A01	160
(PX 61)		001-XXX-011	161
		Catalog Page No. 11	162
		Specimen	163
D-3	652	652B0082211	164
(PX 61)		001-XXX-022 (Sheet 1)	165
		001-XXX-022 (Sheet 2)	166
		Catalog Page No. 19	167
		Specimen	168
D-3	653	653-0824-XX-300	183
(PX 61)		653-04412XX-100	169
		1073XXX	172
D-4	667	667-B461111-208	176
(PX 62)		106XXX	177
		Catalog Page No. 1	178
		Specimen	111 109 (enlarged)
		Sample Pin	110
D-5	668	668-4003XXX	179
(PX 63)		031-056-XXX	180
		1081XXX	181
		Catalog Page No. 17	182
		Specimen	115 113 (enlarged)

		Sample Pin	114
D-6	647	647A152XXXX -007	154
(PX 64)		031-049-XXX	155
		Catalog Page No. 29	156
		Specimen	107 105 (enlarged)
		Sample Pin	106
		Model	108

Because of the number of claims asserted and the number and variations of the accused Wells sockets, the accused Wells sockets have been grouped for trial purposes by Pfaff into three families having common characteristics, and by Wells into four groups having common characteristics. A composite table showing the manner in which both Pfaff and Wells have grouped the Wells accused products is shown below:

TABLE Y – CATEGORIES OF ACCUSED WELLS SOCKETS

CATEGORY A – PFAFF FAMILY I: WELLS GROUP: FOUR

Exhibit No.	Wells Model No.	Wells Drawing No.	Plaintiff's Exhibit No.
D-1	642	642-126XXXX	150
(PX 59)		031-045-XXX	151
		031-050-XXX	152
		Catalog Page No. 25	153

		Specimen	119 117 (enlarged)
		Sample Pin	118
		Model	120

CATEGORY B – PFAFF FAMILY II: WELLS GROUP: THREE

Exhibit No.	Wells Model No.	Wells Drawing No.	Plaintiff's Exhibit No.
D-2	653	1071XXX	170
(PX 60)		1072XXX	171
		Catalog Page No. 3	173
		Specimen	174 121 (enlarged)
		Sample Pin	122
		Model	124
D-2	663	663-240XXXX	175
	653	653-12818X1-100	184
	663	Specimen	123

CATEGORY C – PFAFF FAMILY II: WELLS GROUP: TWO

Exhibit No.	Wells Model No.	Wells Drawing No.	Plaintiff's Exhibit No.
D-3	648	648-0322011	157
(PX 61)		001-XXX-004 (Sheet 2)	158

		Catalog Page No. 9	159
		Specimen	127 125 (enlarged)
		Sample Pin	126
		Model	128
D-3 (PX 61)	649	649A0262011 -A01	160
		001-XXX-011	161
		Catalog Page No. 11	162
		Specimen	163
D-3 (PX 61)	652	652B0082211	164
		001-XXX-022 (Sheet 1)	165
		001-XXX-022 (Sheet 2)	166
		Catalog Page No. 19	167
		Specimen	168
D-3 (PX 61)	653	653-0824-XX-300	183
		653-04412XX-100	169
		1073XXX	172

CATEGORY D – PFAFF FAMILY III: WELLS GROUP: ONE

Exhibit No.	Wells Model No.	Wells Drawing No.	Plaintiff's Exhibit No.
D-4	667	667-B461111-208	176

(PX 62)		106XXX	177
		Catalog Page No. 1	178
		Specimen	111 109 (enlarged)
		Sample Pin	110
D-5 (PX 63)	668	668-4003XXX	179
		031-056-XXX	180
		1081XXX	181
		Catalog Page No. 17	182
		Specimen	115 113 (enlarged)
		Sample Pin	114
D-6 (PX 64)	647	647A152XXXX -007	154
		031-049-XXX	155
		Catalog Page No. 29	156
		Specimen	107 105 (enlarged)
		Sample Pin	106
		Model	108

Pfaff asserts that it has established infringement of claims 1, 6, 7, and 10 by Category A and Category D style Wells sockets and infringement of claims 1, 6, 7, 10, 11 and 19 by Category B and Category C style Wells sockets. Claims 11 and 19 relate to a barb feature explained below. Wells denies any infringement for a variety of reasons including:

(a) The Wells spreaders do not coact with the opposed inner edges of the pins which define the cavity;

(b) The Wells sockets do not contain axially elongated conductive pins;

(c) The pins in the Wells sockets have no inner edges which are inwardly inclined or converging slightly inwardly;

(d) The Wells accused sockets are not used for "leadless chip carriers"; and

(e) There are no barbs found in the Wells accused sockets.

The above infringement issues as well as others will be taken up one by one in the following analysis.

5a. Does the Wells Spreader Coact With Opposed Inner Edges Of The Pins Which Define The Cavity?

Claim 1, paragraph (b) of the Pfaff patent, reproduced in a footnote in Section 4 recites that " . . . the opposed inner edges of the ends of said pins extending from said first major face arranged to define a cavity substantially conforming to at least two oppositely disposed lateral peripheral dimensions of said leadless chip carrier. . . . " Claim 7, paragraph (b) also reproduced in a footnote in Section 4 recites a similar limitation, " . . . the free ends of said contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimension in a plane substantially parallel with said first major face, the ends of said contact means defining said cavity . . . ". Both claim 1, paragraph (c) and claim 7, paragraph (c) call for a unitary spreader

means to coact with the opposed inner edges of the pins. The spreader means is further defined to have a surface inclined with respect to the axis of the contact means and mating with the inclined inner edges of the contact means.

The Indiana Court[12] examined the question of whether the accused Wells devices contained a unitary spreader means which coacted with the inner edges of the pins and whether or not those same inner edges define the cavity in which the chip carrier is placed. Both claim 1 and claim 7 of the Pfaff patent were examined on this issue. The Indiana Court found that there was no infringement.

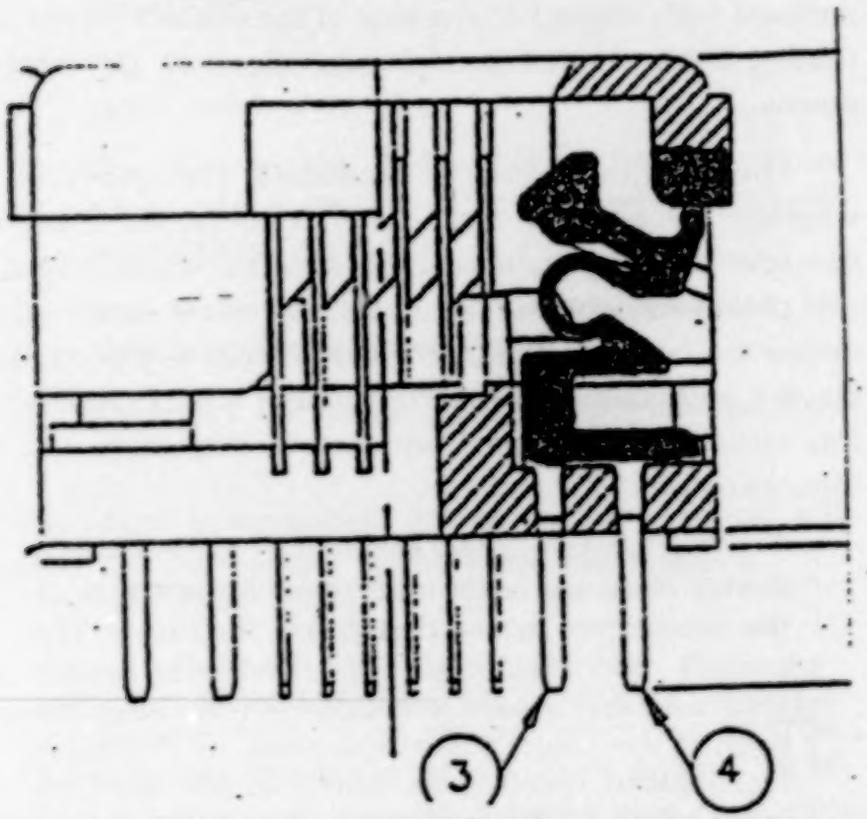
> The unitary spreader means of the Wells device does not coact with those inner edges of the conductive means that define the cavity. The unitary spreader means of the Wells device coacts with an arm extended from the pins. Even if the Court views the arms, as Professor Hal Watson testified on behalf of Mr. Pfaff, as inner edges of the conductive pins, those "inner edges" formed by the arms are not the same "inner edges" that define the cavity.

One of the Wells sockets accused of infringement in the Indiana Court is reproduced below, Defendant Exhibit C-2.

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[12] *Pfaff v. Wells Electronics, Inc.* 9 USPQ2d 1366 at 1370 (N.D. Ind. 1988).

Wells Socket Accused Of Infringement In The Indiana Court



Both of the accused Wells sockets in the Indiana Court employed pins that were engaged by a cap or lid which pressed down on the end of the pin, instead of spreading the pins outward according to the design in the Wells sockets accused of infringement in this case.

The Indiana Court also examined the issue of whether or not the two Wells devices represented by Defendant Exhibits C-1 and C-2 infringed the Pfaff patent through the doctrine of equivalents. After reviewing the prosecution history and the Pauza patent and Anhalt

patent referenced above, the Indiana Court concluded that Pfaff's attorney amended the claims

> . . . to add the phrase "coacting with said inner edges of said pins" in reference to the spreader means. Claims that Mr. Pfaff amended to distinguish them from prior art patents are those that preclude a finding of literal infringement. Mr. Pfaff cannot now contend that the Wells pins, with their return bent parts, are equivalent. He cannot now contend that the Wells device, in which the spreader coacts with the arms extended from the pins, are equivalent. The doctrine of prosecution estoppel precludes resort to the doctrine of equivalents.[13]

On appeal from the Indiana Court, the Court of Appeals for the Federal Circuit affirmed in a brief unpublished opinion.

> We agree with the District Court that the claim requires coaction of the spreader means with the pin ends' inner edges which define the cavity, and that the spreader means of the Wells device coacts with a portion of the pin ends that does not define the cavity. We further agree that Wells' spreader means does not mate with the inner edges defining the cavity . . .
>
> . . .
>
> We agree with the District Court that Pfaff was precluded by prosecution history estoppel from construing as equivalents Wells' pins with return bent parts and spreader means coacting

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[13] *Pfaff v. Wells Electronics, Inc.* 9 USPQ2d, 1371 (N.D. Ind. 1988).

> with the arms extending from the pins. In overcoming the *Pauza* and *Anhalt* references, Pfaff amended his claims, adding "axially elongated" to limit his pins and "inner edges" to limit the structure defining the cavity. Pfaff's claim interpretation would thus resurrect subject matter surrendered.[14]

In this case the court granted a Motion for Summary Judgement finding that the six Wells sockets accused of infringement in this case did not infringe the Pfaff patent. The basis for the Summary Judgement was the same as that found in the Indiana Court. The Wells sockets lacked the recitations in claims 1 and 7 requiring that "the unitary spreader means of the Wells device coacts with those inner edges of the conductive pins that define the cavity."[15]

This summary judgment was also applied to claim 19 because it tracks the language of claims 1 and 7 on the issue of infringement. With regard to infringement under the doctrine of equivalents, this court said –

> It is beyond question, and the Indiana Court has so found, that one of the specific elements amended by Plaintiff to overcome the deficiencies of his application Claims 1 and 7 was that the spreader means operated on and coacted with the *inner* edges of the pin, as contrasted to the outer edges. *Pfaff*, 9 USPQ2d at 1371. Furthermore, the *inner* edges of the pins was

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[14] *Pfaff v. Wells Electronics, Inc.* 12 USPQ2d 1158 (Fed. Cir. 1989).

[15] Memorandum Opinion and Order, Page 4, Filed June 2, 1992.

> defined as those edges "mating with" or "defining the cavity". *Id.* at 1370-71; see also *Pfaff*, 12 USPQ2d at 1159. Plaintiff now can not contend that Defendant's devices with the spreader means coacting on the outer edges of the pins which do not mate with or define the cavity or equivalents. *See Pfaff*, 9 USPQ2d at 1371. The doctrine of prosecution estoppel defeats Plaintiff's reliance on the doctrine of equivalents.[16]

The Court of Appeals for the Federal Circuit reviewed this court's grant of the Motion for Summary Judgement and reversed and remanded for further proceedings.[17] The Federal Circuit acknowledged that –

> We agreed with the Indiana Court that Wells' devices were non-infringing because their pins were not axially elongated and did not incline in a plane substantially parallel to the first major face, and because their spreader contacted with a portion of the pin ends that did not define the cavity. We also agreed with the Indiana Court that prosecution history estoppel prevented Pfaff from construing Wells' pins and spreader as equivalents; "Pfaff amended his claims [to overcome prior art by] adding 'axially elongated' to limit his pins and 'inner edges' to limit the structure defining the cavity."[18]

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[16] Memorandum Opinion and Order, Page 9, Filed June 2, 1992.

[17] *Pfaff v. Wells Electronics, Inc.* 28 USPQ2d 1119 (Fed. Cir. 1993).

[18] *Pfaff v. Wells Electronics, Inc.* 28 USPQ2d at 1121 (Fed. Cir. 1993).

However, the Federal Circuit went on to state that –

> We have said previously that "judicial statements regarding the scope of patent claims are hypothetical in so far as they purport to resolve the question of whether prior art or products not before the Court would, respectively, anticipate or infringe the patent claims."[19]

The Federal Circuit went on to identify the issue to be resolved on remand.

> Here, the district court and both parties agree that the claim interpretation of the Indiana case – that "the claim requires the coaction of the spreader means with the pin ends' inner edges which define the cavity" – controls in this case. They are correct. The prior claim interpretation has issue preclusive effect in the present case in so far as it was necessary to the judgement of non-infringement in the previous case. The dispute is whether the six devices charged with infringement here contain a spreader which coacts with the inner edges defining the cavity.

Pfaff contended that:

1. The phrase "inner edge" in the claims does not means the physically innermost edge which contacts the chip carrier;

2. The spreaders of the Wells devices in this case coact with the inner edge of the pins, not the outer edge;

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[19] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1122)Fed. Cir. 1993).

3. The "inner edge" of the pins should be interpreted to mean any inwardly facing surface of the pin which borders the cavity.

4. The cavity is not limited to the immediate area where the chip carrier nests, but extends vertically along the entire length of the pins between the base support and the lid. The cavity is determined in part by the contact point where the spreader engages the pins.[20]

The Federal Circuit agreed with Pfaff that neither the Indiana Court nor the Federal Circuit construed cavity as the immediate nesting locale of the chip.

The Federal Circuit concluded that

> . . . The district court made a factual finding that the accused spreaders coact with a point that is not an inner edge defining the cavity.
>
> We do not think that the district court could make such a factual finding based on the rough drawings, which were the only evidence before the district court pertaining to the six devices.
>
> Defendant's Exhibits D-1 and D-2 show devices in which the spreader appears to contact inner edges that define the cavity. Exhibits D-3 through D-6 are ambiguous on this point, but the evidence must be viewed in the light most favorable to Pfaff, the non-moving party, and reasonable inferences should be drawn in his favor.[21]

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[20] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1123 (Fed. Cir. 1993).

[21] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1123, including footnote 3 (Fed. Cir. 1993).

With regard to the doctrine of equivalents, the Federal Circuit went on to conclude that the existence of the question of whether or not the accused spreaders coact with an "inner edge" that defines the cavity or an "outer edge" that does not, which renders summary judgement on the literal infringement issue improper, likewise renders Summary Judgement improper on whether the accused spreaders infringe under the doctrine of equivalents.[22]

In view of the Federal Circuit's opinion in this case, Wells has shifted its argument to one of the degree to which the spreader contact with the inner edges of the pin can be located outside of the immediate nesting locale of the carrier. Wells places emphasis on the limitation in claim 1 requiring that the inner edges of the pins define a cavity "substantially conforming to at least two oppositely disposed lateral peripheral dimensions of said leadless chip carrier . . . ". See claim 1, paragraph (b). Wells points out that Pfaff's own expert, Mr. Giesen, suggested that "substantially conforming" means *reasonably close* and *generally conforming to the dimensions of the carrier.*[23] This court finds no reason why the claim limitation "substantially conforming" should be so limited.

Another argument raised by Wells on this issue of infringement is that the Wells pins have one set of inner edges, those that contact the chip carrier defining a cavity approximately the size of the carrier. Then there is another set of inner edges, those which coact with the

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[22] *Id.* at 1124.

[23] Trial transcript, pages 222-225.

spreader that define a cavity significantly larger than the size of the chip carrier. Furthermore, with regard to the Wells category D[24] sockets, the pins are shaped so that the spreader coaction surface is outside the chip carrier and *behind the contacting inner edge*. Wells argues that the fact that the second inner edge is located *behind the contacting inner edge* means that the inner edges contacting the spreader do not define a cavity "substantially conforming" to the size of the chip carrier. Wells does not argue that the spreader contacts an inner edge of the conducting pins, but rather the inner edge so contacted is behind the first inner edge that makes contact with the chip carrier and accordingly does not define a cavity "substantially conforming" to the size of the chip carrier.

Wells continues along with this same argument by defining all sides of the cavity. The housing defines the floor of the cavity, the spreader defines the top of the cavity, and the "inner edges" define the sides of the cavity which form substantially vertical sidewalls in the case of the preferred embodiment shown in the Pfaff patent. On the other hand, Wells points out that the Category D Wells sockets have pins with an outset arm which extends outwardly and downwardly, forming a *complex gap behind* the carrier contacting surface of the pin. The complex gap behind the carrier contacting surface in no way resembles a substantially vertical "sidewall" of a cavity. Therefore, Wells contends, the category D spreader does not coact with an "inner edge" that defines the cavity.

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[24] Category D listed in Table Y above consists of the Wells models shown in Defendant's Exhibit D-4 through D-6.

The prosecution history reviewed above in connection with *Pauza* and *Anhalt* makes it clear that the claim language added by way of amendment was to specifically identify which side of the contact pin coacts with the spreader. That is, the inner edge as opposed to the outer edge of the pin. Nothing can be found in the prosecution history or specification that would place a narrow restriction on the location of the coaction point between the pin and spreader. This court finds that the cavity is not limited to the nesting locale of the chip carrier and that it can extend at least as far as the spreader contact with the pins contained in the Category A and Category B (Defendant Exhibit D-1 and Defendant Exhibit D-2) Wells sockets. These sockets were the subject of a comment by the Federal Circuit which is consistent with this finding.[25] This court finds that the cavity can extend as far as the laterally removed point where the spreader coacts with the inner edge of the pin and that the introduction of a *complex gap behind* the contacting surface of the pin does not save the Wells Category D, or any of the other accused Wells sockets from falling within the literal scope of the limitations in claims 1, 7 and 19 relating to this issue of infringement.

With regard to Category A (Defendant's Exhibit D-1) Wells accused socket, a different argument is raised by Wells concerning this issue of whether or not the spreader coacts with the inner edge of the pins defining

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[25] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1123, note 3 (Fed. Cir. 1993) "Defendant's Exhibits D-1 and D-2 show devices in which the spreader appears to contact inner edges that define the cavity."

the cavity. Wells points out that important pre-loading components of the device place the spreader contacting portion of the pins *outside* the base, and consequently, outside any possible cavity. When the spreader is depressed, the pins are urged outwardly and the *entire* surface of the pin is located and hidden behind base parts. Wells contends the "inner edges" of the pins located external to the base parts are not "inner edges that define the cavity." Portions of the pins that are located "outside" the socket base within which the carrier is placed cannot be part of any cavity which receives the carrier.[26]

Whether or not Wells' assertions are factually accurate, this court finds no limitations in claims 1, 7 or 19 require that the cavity be within the base parts, or that the cavity be void of any base parts or spreader parts at all times during the operation of the accused devices.[27]

In summary, this court finds that all six Wells sockets have spreaders which coact with opposed inner edges of the pins which define the cavity.

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[26] Wells refers to Plaintiff's Exhibit 59 and Defendant's Exhibit D-1 for support of its argument.

[27] The Court also observes that this Category A Wells device corresponds to the Wells accused socket shown in Defendant's Exhibit D-1 which was specifically identified in footnote 3 of the Federal Circuit opinion as one of the sockets in which the spreader appears to contact inner edges that define the cavity. *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1123 in note 3 (Fed. Cir. 1993).

5b. Are The Wells Pins Axially Elongated

Independent claims 1, 7 and 19 of the Pfaff patent each require a plurality of *axially* elongated conductive pins or contact means. Claim 7 as originally filed in the Pfaff patent application contained the language "a plurality of axially elongated contact means."[28] Claim 1 as originally filed in the Pfaff patent application omitted the words *axially elongated* and simply recited "a plurality of conductive pins". Although other amendments were made to application claim 1 in the response to the first Office Action, it wasn't until the response to the second Office Action that the words *axially elongated* were inserted into the recitation "a plurality of axially elongated conductive pins."[29] Independent claim 19 was presented for the first time in the response to the second Office Action and claim 19 included the *axially elongated* language. In the specification of the Pfaff patent as filed the words *axially elongated* were used a number of times to describe the conductive pins.[30]

In the prosecution history the Examiner used the words *axially elongated* in the first Office Action. In describing the Pauza patent,[31] Figure 3 shown in Section 4, the Examiner in the first Office Action stated that "Pauza et al disclosed mounting means for a leadless chip carrier including a plurality of axially elongated contact

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[28] Pfaff patent claim 7, paragraph (b), first line.

[29] See Pfaff patent claim 1, paragraph (b), first line.

[30] See the ABSTRACT, lines 4 and 5, and column 3, line 49, for example.

[31] U.S. Patent 3,753,211, Defendant Exhibit ABC.

means 58 moveable to and from the chip by axially moveable cams or flanges 80." As can be seen in Pauza, Figure 3, the contact means 58 has a knee in the region designated 68 producing a substantial divergence from the otherwise vertically straight contact means 58. The Examiner implicitly found that the elongated contact means 58 in Pauza et al was *axially* elongated. Pfaff's attorney did not disagree, but made arguments distinguishing over Pauza for other reasons, some of which are set forth in Section 4. Pfaff did not amend claim 1 following this first Office action, and did not need to amend the other independent claims 7 and 19 since they already contained the terms *axially elongated*.

In the second Office Action the Examiner does not mention or use the words *axially elongated*. In the response to the second Office Action, Pfaff's attorney presents claim 19 for the first time and it includes the words *axially elongated*. Claim 1 was also amended inserting the words *axially elongated*. In the remarks contained in the response to the second Office Action, Pfaff's attorney argues distinctions in the claims including amendments to the claims in order to overcome the prior art cited by the Examiner. Some of these arguments are included in Section 4 above. However, none of the arguments relate to the amendment to claim 1 inserting the words *axially elongated* or these same words appearing in original claim 7 or newly introduced claim 19. The words *axially elongated* were not the basis for the Pfaff attorney's arguments which secured allowance of the Pfaff patent.

The Indiana Court dealt with this issue of whether or not the accused Wells sockets included pins which are *axially elongated*. The Indiana Court found:

> 1. The Wells socket construction does not have "axially elongated conductive pins". Instead, it includes conductive pins that are shortened and are rolled outwardly by a return bent portion."[32]

Claims 1 and 7 were asserted in the Indiana Court, and claim 19 was not. However, the claim language in claim 19 tracks the *axially elongated* language appearing in claims 1 and 7. The Federal Circuit reviewed the Indiana Court's decision and stated that –

> Pfaff says "axially elongated" is merely a directional limitation. Wells says it is also a limitation on shape and orientation. The court agreed with Wells, saying its pins are not "axially elongated", but "are shortened and are rolled outwardly by a return bent portion". We agree with the District Court.[33]

In the appeal from this court's decision on the Motion for Summary Judgment, the Federal Circuit did not review the issue of whether or not the six Wells sockets accused of infringement in this case contained pins which are *axially elongated*. It was not part of the issues included in the Motion for Summary Judgment. However, the Federal Circuit reasserted its agreement with the Indiana Court on the infringement issues.[34] The

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[32] *Pfaff v. Wells Electronics, Inc.*, 9 USPQ2d at 1369 (N.D. Ind. 1988).

[33] *Pfaff v. Wells Electronics, Inc.*, 12 USPQ2d at 1159 (Fed. Cir. 1989).

[34] "We agreed with the Indiana Court that the Wells' devices were non-infringing because their pins were not axially elongated and did not incline in a plane substantially parallel to the first major face, and because their spreader coacted with a portion of the pin ends that did not define the cavity." *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1121 (Fed. Cir. 1993).

Federal Circuit went on to state that the Indiana Court "claim interpretation has issue preclusive effect in the present case in so far as it was necessary to the judgment of non-infringement in the previous case."[35] On the other hand, the Federal Circuit said in the same case that judicial statements regarding the scope of patent claims are hypothetical in so far as they purport to resolve the question of whether prior art or products not before the court would respectively, anticipate or infringe the patent claims.[36] Continuing along this line, the Federal Circuit provided further guidance citing a quote from *Del Mar Avionics, Inc. v. Quinton Instrument Co.* 836 F.2d 1320, 1324, 5 USPQ2d 1255, 1258 (Fed. Cir. 1987), "A device not previously before this court, and shown to differ from those structures previously litigated, requires determination on its own facts."

Pfaff has consistently and on a number of occasions urged the court to begin its infringement analysis by performing the first necessary step of claim interpretation, particularly adopting a definition of the term *axially elongated*.[37] The court is mindful of its responsibility to set

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[35] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d, at 1122 (Fed. Cir. 1993).

[36] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1122 (Fed. Cir. 1993).

[37] See for example page 4 of PLAINTIFF'S SUGGESTIONS REGARDING DRAFT REPORT AND FINDINGS OF FACT AND CONCLUSIONS OF LAW RECOMMENDED BY SPECIAL MASTER RE: PATENT INFRINGEMENT AND VALIDITY, filed April 3, 1995.

out the meaning of the language in patent claims as recently reinforced by the Federal Circuit in *Markman v. Westview Instruments, Inc.*, 52F.3d 967, 34 USPQ2d 1321. The parties have advanced various interpretations of the term *axially elongated*. Pfaff puts forth the argument that Wells is precluded by the "doctrine of inconsistent positions". According to Pfaff, Wells put forward a simple definition of *axially elongated* in its brief on appeal from the Indiana Court decision, and now is taking the position in this case that the definition should be much more complex and harder to satisfy. On page 10 of Wells' brief filed with the Court of Appeals for the Federal Circuit in the appeal from the Indiana Court decision, Wells stated that

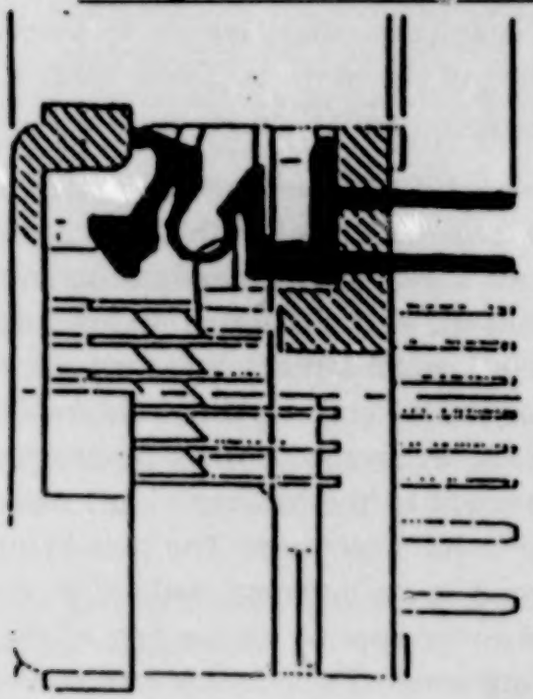
> Due to the Pfaff's mode of operation of this socket device and its related camming action between its spreader and the elongated contacts, the contacts must be provided with substantial vertical length to permit the spreading or bending of the contacts. Such is not the situation with regard to the Wells contact. If the pins or contacts in the Pfaff device were substantially shortened, an excessive force would have to be applied by the top or spreader to the contacts to move them laterally. As such, the words "axially elongated" find a realistic and necessary place in the description of the Pfaff invention.
>
> Accordingly, it is submitted that the Trial Court properly construed and interpreted the language "axially elongated" utilized in the Pfaff patent-in-suit and properly found no literal infringement regarding this element.

Pfaff complains that Wells was successful in urging the Federal Circuit to find that the accused contacts in the

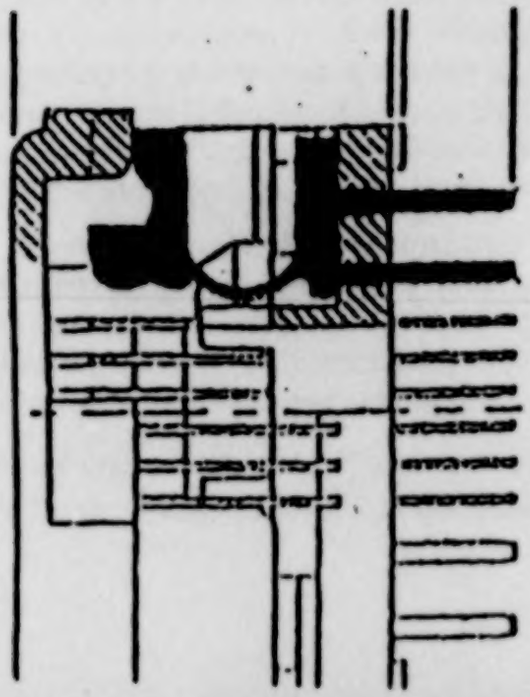
Indiana Court were not *axially elongated* because the contacts did not fit Wells definition, "the contacts must be provided with substantial vertical length to permit the spreading or bending of the contacts." Now Wells should be made to stay with its definition in this case.

As can be expected, Wells has a contrary view of the above quote. In its post-trial brief in this case beginning on page 10, Wells says that it was merely describing the mode of operation of the Pfaff invention, not providing a general definition or construction of the words *axially elongated*. Wells was simply arguing that a short Pfaff pin is too stiff to operate, whereas the short pin of the type accused of infringement in the Indiana Court still functions properly due to its outset arm. The pins before the Indiana Court spread in an outward, rolling movement, from a downward force applied to the top of the pins outwardly extending arms. The arms are shown in the illustration below with reference to the C-1 and C-2 sockets.

Wells C-1 And C-2 Sockets Accused Of Infringement In The Indiana Court

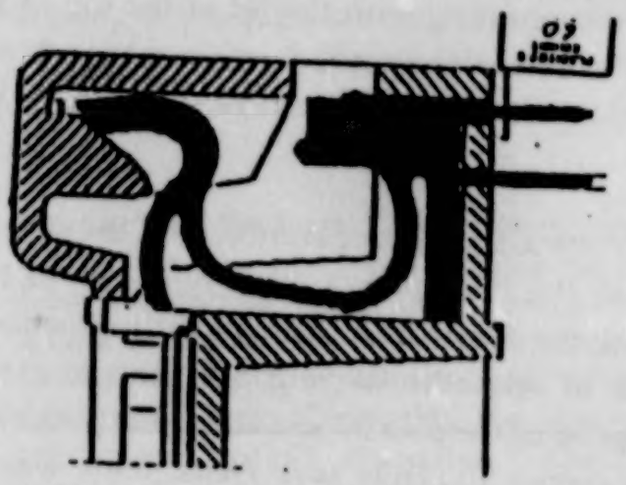


C-2

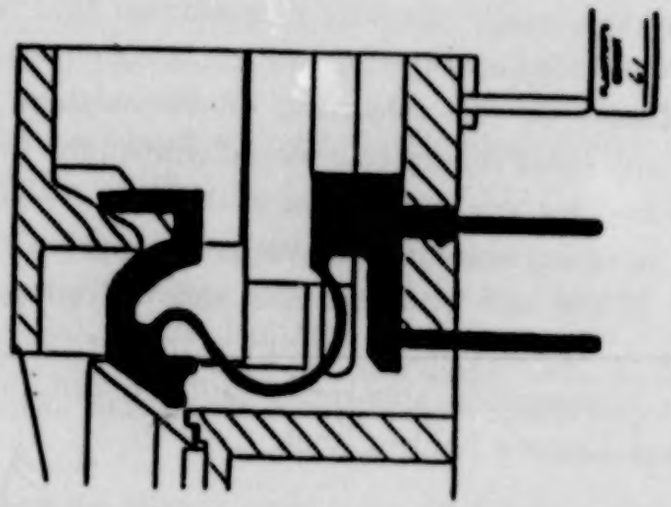


C-1

Wells Category C and Category B Sockets Accused of Infringement This Court



CATEGORY B



CATEGORY C

Wells sockets C-1 and C-2 were accused of infringement in the Indiana case. The above illustration shows the arm of the pin coacting with the lid at the top of the socket. When the lid is depressed, the arm moves downward in response to the downward force supplied by the top.

Wells was contrasting this operation with the spreading operation in the Pfaff patent. With reference to Figures 4 and 5 of the Pfaff patent illustrated in Section 2 above, the lid or spreader 40 engages the outwardly diverging edges 50 of the pins 20 spreading the pins away from the chip carrier 10. Thus says Wells, there was no attempt in the Indiana appeal to define *axially elongated* to encompass all pins that are capable of spreading simply because they have a "substantial vertical length to permit the spreading or bending of the contacts."

The court finds that Wells was not construing the claim language *axially elongated* in a manner that would constitute an admission against interest, a change of position precluded by the "doctrine of inconsistent positions", or any other theory that would control the finding of a definition for *axially elongated* in this case. The court, however, is in agreement with Wells description of the operation of the two different pins and will adopt portions of it in developing a definition in this case. This difference in operation apparently laid a foundation for the Indiana Court's holding that:

> 1. The Wells socket construction does not have "axially elongated conductive pins". Instead, it includes conductive pins that are shortened and are rolled outwardly by a return bent portion.[38]

Having disclaimed the short simple definition of *axially elongated*, Wells in its post-trial brief in this case, pages 11 and 12, goes on to attempt to provide another definition:

> Simply put, the term "axially elongated" probably defies any precise definition as is evident from the diverse testimony of record. However, a look at the spectrum of pins examined in this as well as past proceedings helps to shed some light on the term. Obviously, the pins of the '377 patent are "axially elongated." The '377 pins, continually referred to by Pfaff as "blades," are of simple shape, elongated about a single axis. Common sense dictates that if something is "elongated," then it is longer than it is wide. However, "*axially* elongated" must be further limiting. Otherwise, the pins in the Indiana suit, which were longer than wide, would have met the "axially elongated" language. The further limitation on the term "elongated" supplied by the addition of the term "axially" necessarily requires that an infringing pin be substantially longer about a single simple axis relative to the pins' width.
>
> Looking back to the Indiana case, the Indiana pins were not found to be "axially elongated." The Indiana pins were not simple shapes, elongated about a single axis, although admittedly they were longer than they were

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[38] *Pfaff v. Wells Electronics, Inc.*, 9 USPQ2d at 1369 (N.D. Ind. 1988).

> wide. However, the Indiana pins were not substantially longer than wide about a common axis. And although the Indiana pins spread, they spread by rolling outwardly and would function in much the same manner regardless of their overall length. Indeed, the significant distinctions of the Indiana pins is that they were "shortened and . . . *rolled outwardly by a return bent portion.*"

Having reviewed the diverse testimony of record in this court as well as the Indiana Court and the arguments of counsel, this court finds that the proper construction of the term *axially elongated* in the claims of the Pfaff patent is as follows:

> *Axially elongated* means that the conductive pin must be provided with substantial vertical length along an axis normal to the first and second major faces of the base support means, such vertical length being measured from said base support to the point on the inner edge of the pin which makes contact with the unitary spreader means, to permit, given the thickness and stiffness of the construction of the pin, a spreading of the end of the pin due to a force applied in a direction perpendicular to said axis in response to depression of said unitary spreader means along the direction of said axis and toward said base support.

In adopting the above construction of the *axially elongated* claim language the court rejects Wells' definition to the extent it requires that the pin be "simple" in design and without overall complex pin shape.

The court has applied the above construction of the term *axially elongated* to the four categories of Wells

sockets A through D. Categories B and C are shown in the illustration above in this Section 5b. Wells sockets in Category A and Category D are not illustrated herein, but may be found in the exhibits identified in the footnote below.[39] It is the court's finding that all Categories A-D of Wells sockets fall within the court's above construction of the term *axially elongated*. In fact, the Wells sockets in Category A and Category D would appear to conform to Wells' definition calling for a "simple", non-complex pin shape. Wells Category B and Category C pins, shown in the illustration above in this section 5b., have an extremely arched central spring portion generally shaped in the form of the letter "C". While this shape may appear to be complex as compared to a "simple" axial elongation, a similar "C"-shaped configuration appears in pin 20 in Figs. 4 and 5 of the Pfaff patent illustrated above in Section 2.

Although the Pfaff preferred embodiment has a "C"-shaped pin 20 configuration which is much smaller than the "C"-shaped pin configuration in Wells Category C and Category B sockets, nevertheless the "C"-shaped configuration performs exactly the same function. It permits the end of the pin contacting the spreader to move in a direction perpendicular to the vertical axis of the pin.

Having found that the Wells sockets have pins which are *axially elongated*, the court's inquiry into this issue is still not concluded because of the prior proceedings in

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[39] Category A and Category D include pins whose shape is represented in Defendant Exhibit D-1, Defendant Exhibit D-4, Defendant Exhibit D-5, and Defendant Exhibit D-6 including Wells model numbers 642, 667, 668 and 647.

the Indiana Court. The same parties have been before the Indiana Court asserting infringement of claims 1 and 7 of the same Pfaff patent by a Wells leadless chip carrier socket. Earlier in this Section 5b. reference is made to the Federal Circuit's guidance with respect to the preclusive effect of the Indiana Court's claim interpretation. Recently the Federal Circuit has provided additional guidance in the *Comair* case[40] regarding issue preclusion, which protects the defendant from the burden of litigating an issue that has been fully and fairly tried in a prior action and decided against the plaintiff. The Federal Circuit set forth the elements that the defendant must show:

> The defendant must show that in the prior action the party against whom estoppel is sought had a full and fair opportunity to litigate the issue; the issue was actually litigated; the controlling facts and applicable legal rules were the same in both actions; resolution of the particular issue was essential to the final judgment in the first action; and the identical issue was decided in the first action.[41]

While Wells has not provided this court with an assembly of the above enumerated elements in a single oral argument, brief or other document, nevertheless the presence of these elements or lack thereof can be found in the record developed before this court, or before the

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[40] *Comair Rotron, Inc. v. Nippon Densan Corp.* 33 USPQ2d 1929 (Fed. Cir. 1995).

[41] *Comair Rotron, Inc. v. Nippon Densan Corp.* 33 USPQ2d 1929,1930 (Fed. Cir. 1995).

Indiana Court and admitted on joint motion as evidence in this case.[42]

Taking the elements in the order presented in the *Comair* case, this court has no reason to believe that Pfaff did not have a full and fair opportunity to litigate the issue of infringement and, in particular, the construction of the term *axially elongated* in the Indiana Court. Also, this court finds that the issue of infringement and, in particular, the interpretation of the term *axially elongated* "was actually litigated" in the Indiana Court.

The "applicable legal rules" would appear to have been the same in both the Indiana Court and this court, but "the controlling facts" may have been different since the Wells sockets accused of infringement in the Indiana Court were different from the Wells sockets accused of infringement in this court. This question will be addressed below in connection with the last element in the *Comair* case.

The next element the defendant must show in order to establish that the Indiana Court construction of the term *axially elongated* has issue preclusive effect upon this court, is that the "resolution of the particular issue was essential to the final judgment in the first action" according to the above quote from the *Comair* case. This element of the *Comair* case has been specifically addressed by the parties in this case.

Pfaff contends that "issue preclusion does not apply when alternative grounds form the basis for the first

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[42] See JOINT MOTION FOR CONSIDERATION OF STIPULATED EVIDENCE, filed June 1, 1992.

judgment" according to the *Comair* case.[43] The Indiana Court gave three different reasons why the Wells sockets did not infringe claims 1 and 7 of the '377 Pfaff patent. The three different reasons are very similar for both claims 1 and 7 and are quoted in full length below with respect to claim 7:

> The Wells device differs from Claim 7 of the patent-in-suit in three ways:
>
> 1. The Wells socket construction does not have "axially elongated conductive contact means". Instead, it includes conductive contact means that are shortened and are rolled outwardly by a return bent portion.
>
> 2. Sub-paragraph (b) of Claim 7 describes the contact means as "having edges which incline inwardly toward said cavity in said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel with said first major face". The contact means of the Wells device are not so inclined.
>
> 3. Sub-paragraph (c) of Claim 1 describes a "unitary spreader means . . . mating with said inclined inner edges of said contact means . . . " Again, as with Claim 1, the unitary spreader means of the Wells device does not mate with

[43] See page 2 of PLAINTIFF'S SUGGESTIONS REGARDING DRAFT REPORT AND FINDINGS OF FACT AND CONCLUSIONS OF LAW RECOMMENDED BY SPECIAL MASTER RE: PATENT INFRINGEMENT AND VALIDITY, filed April 3, 1995.

> those inner edges of the conductive contact means that define the cavity.[44]

From the above it is clear that the claim construction for the term *axially elongated* is only one of three alternative reasons why the Indiana Court found that claims 1 and 7 were not infringed by the Wells sockets.

If Pfaff's assertion is correct that "issue preclusion does not apply when alternative grounds form the basis for the first judgment", then this court is free to make its own findings regarding construction of the term *axially elongated*. In the *Comair* case the court found that there were a number of non-infringing substitute products in the marketplace precluding the possibility of the patent owner securing damages in the form of lost profits from the infringer. Damages based on a reasonable royalty would then be awarded. In making its findings, the District Court determined that one of the products in the marketplace did not infringe the patent in suit. Since the product found not to infringe was only one of a number of non-infringing products in the marketplace that would prevent recovery of lost profits, the Federal Circuit found that this specific finding was not shown to be essential to the prior court's judgment. "It suffices to negate preclusion that the finding as to Nidec's infringement was not essential to the damages decision in the New Jersey action."[45]

[44] *Pfaff v. Wells Electronics, Inc.*, 9 USPQ2d at 1370 (N.D. Ind. 1988).

[45] *Comair Rotron, Inc. v. Nippon Densan Corp.* 33 USPQ2d 1929,1931 (Fed. Cir. 1995).

Wells in its COMMENTS OF DEFENDANT ON DRAFT REPORT REGARDING FINDINGS OF FACT AND CONCLUSIONS OF LAWS RECOMMENDED BY THE SPECIAL MASTER, filed April 3, 1995, beginning page 6 argues that the Indiana Court decision was different from the decision in the *Comair* case.

> Judge[ment] Miller found that the socket devices accused to infringe in the Indiana case avoided the claims of the Pfaff patent there in litigation by not being axially elongated, by not having inner edges of the pins which define the cavity as coacting with the top or spreader, and further by not having inner edges which converge slightly inwardly or which incline inwardly. All three of these findings, which each being essential to the final judgement in the case, were in their entireties affirmed by the Federal Circuit. Thus, in accordance with the position taken by Moore's in Section 0.443 [5.1 -1], issue preclusion would be proper on any one of the three issues so decided by Judge Miller and so affirmed by the Federal Circuit. As indicated on page 594 of Moore's, all three discussed issues or findings of fact of non-infringement would be a basis for issue preclusion assuming the other elements for its existence would be present. The Restatement of Judgements at Section 27 referred to in the Comair case and of which a copy accompanies this response provides its reason for questioning whether issue preclusion would be appropriate when there were alternative grounds in the first case. It is said that issue preclusion may not be appropriate since the alternative grounds are more than one in number and thus each may not have been thoroughly considered or the losing

> party which is entitled to appeal each of the alternative grounds might be dissuaded from doing so. But the Restatement goes on further to say that the bottom of page 259 that there may be situations where despite these reservations the balance is tipped in favor of issue preclusion because of the fullness which the issues were litigated and decided in the first case. This is most certainly here since in the Indiana case Judge Miller carefully and fully discussed the alternative grounds or issues and made specific findings as to each, which findings were in their total appealed by the Plaintiff to the Federal Circuit and in which the Federal Circuit fully concurred in each of the findings with Judge Miller. Thus, the Plaintiff was not dissuaded from appealing and he most certainly had a most full and adequate hearing by both the district and the appellate court concerning each of the issues.

This court having considered the arguments of both parties finds that Wells' arguments are more persuasive and that the Indiana Court's interpretation of the term *axially elongated* was essential to the final judgment in that case. However, in making this finding the court does not mean to imply that the Indiana Court has, in fact, defined the term *axially elongated* in a positive sense so that one can determine what pin shapes fall within the Indiana Court's definition. Instead, the Indiana Court found that the pins in the Wells sockets C-1 and C-2 in the above illustration in this Section 5b. do not infringe claims 1 and 7 of the Pfaff patent because they include "conductive contact means that are shortened and are rolled outwardly by a return bent portion." Accordingly the Indiana Court defined a shape that was *not axially elongated*.

This type of negative claim construction, while essential to the final judgment of the Indiana Court, is necessarily specific to the particular shape of the pins before the Indiana Court. This court does not interpret the negative claim construction of the Indiana Court to mean that all conductive pins including shapes "that are shortened and rolled outwardly by a return bent portion" fall outside of the term *axially elongated*, regardless of whether or not such pins have additional features or shapes that would make them *axially elongated*. If such an interpretation were to be placed upon the Indiana Court's claim construction, then this court would conclude that this element of the *Comair* case was not satisfied since such an overly broad interpretation of the Indiana Court's construction of the term *axially elongated* was not essential to the Indiana Court's final judgment. This court finds that such an overly broad interpretation of the Indiana Court's claim construction would result in a conclusion that there should be no issue preclusion for reasons similar to those found in the *A.B. Dick* case referenced by the Federal Circuit in the *Comair* case.

> In *A.B. Dick Co. v. Burroughs Corp.*, 713 F.2d 700, 218 USPQ 965 (Fed. Cir. 1983), *cert. denied*, 464 U.S. 1042 (1984) this court declined to impose collateral estoppel based on the first court's interpretation of the scope of patent claims, this court stating that the interpretation of patent claims is not done in the abstract, and was not "essential to a final judgment on the question of validity or infringement." 713 F.2d at 704, 218 USPQ at 968.[46]

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[46] *Comair Rotron, Inc. v. Nippon Densan Corp.* 33 USPQ2d 1929,1932 (Fed. Cir. 1995).

Turning to the last element of the *Comair* case, this court finds that "the identical issue" was *not* decided in the Indiana Court. The issue before the Indiana Court is defined on two levels by Pfaff. First, the broad issue of whether or not the same Wells sockets were before the Indiana Court and before this court. A more narrow definition of the issue is whether or not the same pin shapes were before the Indiana Court and before this court. If the issue is to be decided on the basis of the first broader definition, then clearly the Wells sockets C-1 and C-2 shown in the above illustration in this Section 5b. are different from the Wells sockets in Category A through Category D in this case. One gross difference in the sockets is the method of operation of the lid or top which exerts a downward force in the sockets before the Indiana Court while the top in the sockets before this court exerts a spreading force on the pins perpendicular to the direction of downward motion of the top.

This court finds that it is more appropriate to examine the last element of the *Comair* case (to determine whether or not the identical issue was decided in the Indiana Court) on the basis of the more narrow definition of the issue. Are the *pins* identical in the sockets before the Indiana Court with the *pins* in the sockets before this court. While the entire Wells sockets need not be examined for determination of this issue, it is the court's finding that the entire shape of the pins needs to be examined, not just a portion of the pins that may include "conductive contact means that are shortened and are rolled outwardly by a return bent portion."

The shape of the pins before the Indiana Court are shown in the above illustration in this Section 5b. (see

Wells sockets labeled C-1 and C-2 corresponding to Plaintiff's Exhibit 100 and 101 respectively). The court finds that the pins in Category A and Category D in the Wells sockets before this court are different in configuration and cannot be found to be anywhere near "identical" to the pin configuration in the C-1 and C-2 sockets. Accordingly, issue preclusion is inappropriate in this case, and findings of infringement regarding the *axially elongated* claim language in this Section 5b. are unaffected by the findings in the Indiana Court.

The pins in the Wells Category C and Category B sockets are shown in the above illustration in this Section 5b. With respect to this illustration, Pfaff makes a detailed analysis of the differences between the pins in PLAINTIFF'S SUGGESTIONS REGARDING DRAFT REPORT AND FINDINGS OF FACT AND CONCLUSIONS OF LAW RECOMMENDED BY SPECIAL MASTER RE: PATENT INFRINGEMENT AND VALIDITY, filed April 3, 1995 beginning on page 7:

> Note that in both C-1 and C-2 the spreader coacts with a laterally extending arm which the Indiana court apparently referred to as a "bent return portion." In both C-1 and C-2 the bent return portion
>
> (a) extends in a horizontal direction substantially normal to the vertical axis of the pin;
>
> (b) presents an upwardly-facing portion which coacts with the spreader and is specifically formed to permit the spreader to exert *only* a downwardly (not outwardly) force; and
>
> (c) terminates at an elevation *below* the extreme vertical height of the pin.

The Category B and Category C pins *have no such return bent portion*. While the Category B and Category C pins have contorted shapes (including an extremely arched central spring portion) the Pfaff device also has an identical, albeit smaller, curved spring portion.

In both the Category B and Category C devices, the upper portion of the pin deviates outwardly (reminiscent of the "bent return portion") *but then*

(a) bends upwardly;

(b) terminates in an inclined inner edge end portion which mates with the spreader to force the pin *outwardly*; and

(c) extends upwardly sufficiently to form the vertical extreme top end of the pin.

> Furthermore, the Category B and Category C pins both include an elongated finger portion (characterized by Pfaff as a barb) adapted to reach over and make contact with the *top* of the contact feet on the leadless chip carrier. No such structure (or its equivalent) is found in C-1 or C-2. On the contrary, in the Indiana case Wells adamantly asserted (and the Court so found) that the inner edges of the C-1 and C-2 points *did not overlap* the chip carrier (*Pfaff I*, 9 USPQ2d 1366 at 1370).

This court is persuaded by the Pfaff analysis of the pins shown in the above illustration in this Section 5b. and finds that the pins in Category C and Category B are not identical to the pins C-1 and C-2 in the Wells sockets before the Indiana Court. In fact, the major similarity between the sockets is the "C"-shaped portion of the four pins in the above illustration in this Section 5b. which

gives the pins their ability to spread. The preferred embodiment in the Pfaff patent shown in Figs. 4 and 5 of the illustration in Section 2 above provides the same ability to spread although the "C"-shaped portion of pin 20 of the Pfaff patent is much smaller. Clearly the presence of the "C"-shaped design cannot be found to negate a pin design from being *axially elongated* since the "C"-shaped portion of the pin 20 is illustrated in the preferred embodiment of the patent which is also the preferred example of an *axially elongated* pin. Further, if the Indiana Court construction of the term *axially elongated* is expanded to the point where it means that all pins with a "C"-shaped portion are in fact pins "that are shortened and are rolled outwardly by a return bent portion", then this court as stated in connection with the previous element of the *Comair* case finds that this extended interpretation was *not* essential to the final judgment of the Indiana Court.

A casual inspection of the pin shapes in the above illustration is this Section 5b. would result in a conclusion that the pins before the Indiana Court are similar in shape to the Category C and Category B pins. However, an appropriate, more detailed inspection reveals that they are *not* identical, and accordingly the final element of the *Comair* case is not satisfied. Issue preclusion does not apply to the Category C and Category B Wells sockets.

In summary, this court finds that the pins in Category A through Category D Wells sockets are *axially elongated*.

5c. Do The Wells Pins Have Inner Edges Which Are Inwardly Inclined Or Converging Slightly Inwardly?

Claim 1 of the Pfaff patent requires that the accused sockets have pins which have inner edges *converging slightly inwardly* with distance from the first major face of the base support means.[47] Claim 7 requires that the contact means have edges which *incline inwardly* toward the cavity in a plane substantially parallel with the major face of the support housing.[48] The third independent claim 19 requires that the contact means have edges which *incline inwardly* toward the cavity in a plane substantially parallel with the first major face of the support housing.[49]

The Indiana Court found that the Wells sockets accused of infringement did not have ends *converging or inclining inwardly* as called for in claims 1 and 7 of the Pfaff patent.

> 2. Sub-paragraph b of Claim 1 describes "inner edges of said pins converging slightly inwardly with distance from said first major face". The conductive pins in the Wells device do not have opposed inwardly converging inner edges. Further, Wells' edges are not functionally equivalent to the inner edges of the device described in Claims 1 through 6 of the patent in suit. The inner edges of the Wells device engage only the edge of the carrier and do not overlap to secure

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[47] Pfaff patent, claim 1, paragraph (b).

[48] Pfaff patent, claim 7, paragraph (b).

[49] Pfaff patent claim 19, paragraph (b).

> the carrier as described and shown in the patent-in-suit.[50]

The Court of Appeals for the Federal Circuit agreed. "We further agree that Wells' spreader means does not mate with the inner edges defining the cavity and that the edges of the Wells pin ends do not incline in the plane 'substantially parallel' to the first major face."[51]

The Indiana Court described the Wells accused socket operation. "Under this design, the lid of the socket would be depressed and urge the arm downward, forcing the contact away from the cavity into which the leaderless chip carrier was to be placed; the contacts would spring back when the top was raised and the pressure on the arms removed, contacting the sides of the leaderless chip carrier."[52] Pfaff quotes from Professor Bach's testimony in the Indiana Court contrasting the Indiana device from the Pfaff invention.

> Well, there's a difference there because the Wells device has a contact or should say makes contact on a surface with a vertical tangent. That is on the curved portion or the spring portion of the contact. The contact is made with the leadless chip carrier vertically. Whereas with the Pfaff device the inclined surface makes contact with the chip carrier usually or typically at the top edge, so that the axially elongated member that is in [sic] described in the Pfaff patent in

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[50] *Pfaff v. Wells Electronics, Inc.*, 9 USPQ2d at 1369 (N.D. Ind 1988).

[51] *Pfaff v. Wells Electronics, Inc.*, 12 USPQ2d at 1159 (Fed Cir. 1989).

[52] *Pfaff v. Wells Electronics, Inc.*, at 1369.

> fact forms somewhat of a clamping action whereas the Wells device forms only a squeezing action. (Alp. 328)[53]

There is no disagreement that the pins in the accused sockets in the Indiana Court squeezed the sides of the chip carrier and had no *inner edges* of the pins *converging or inclining inwardly* to hold the chip carrier in place. On the other hand, each of the six accused devices in this case have pins wherein their inner edges include a portion which *inclines inwardly* to contact the chip carrier and hold the chip carrier in place. They do not contact the chip carrier only on a vertical tangent as in the Indiana Court. Accordingly, the prior claim interpretation by the Indiana Court does not have issue preclusive effect in the present case.[54]

The parties in this case dispute the question of whether or not the six Wells sockets have pins with *inwardly inclining* edges. Pfaff defines these words to mean any portion of the inside edges which extend, at least partially, in the direction toward the carrier. The function of the inclined edge is to securely lock the carrier within the housing. " . . . the inclined edges 51 of the blades b are urged into the depressions 12 to form physical and electrical contact with the lands 12. Furthermore, since the edges 51 are inclined inwardly from the vertical,

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[53] See attachment "K" of Pfaff Supplemental Trial Brief for Infringement Portion filed July 1, 1994.

[54] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1122 (Fed. Cir. 1993).

the blades b securely lock the leadless chip carrier within the mounting housing."[55]

Pfaff claims that Wells concedes that Category 1 sockets have pins with *inwardly inclined* edges referring to the trial testimony in this case of Mr. Midili, President of Wells referring to Defendant Exhibit E-1 corresponding to Category A sockets also illustrated in Defendant Exhibit D-1.

> Q. Would you indicate those particular edges by a green mark?
>
> A. (Witness complies.)
>
> Q. Do those inner edges which you have so described converge slightly inwardly with distance from the first major face?
>
> A. They do. Actually (drawing) that's were they should be, yeah.[56]
>
> . . .
>
> Q. And you indicated what those inner edges would be?
>
> A. I have. Green.
>
> Q. Green?
>
> A. Yes.
>
> Q. Do those edges incline inwardly towards the cavity?
>
> A. Yes, they do.

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[55] Pfaff Patent 4,491,377, column 5, lines 16-22.

[56] Trial transcript in this case, page 420, lines 11-21.

> Q. Do they incline outwardly?
>
> A. No.[57]

Pfaff contends that the Category D sockets with pins illustrated in Defendant Exhibits D-4, D-5 and D-6 have *inwardly inclined or converging edges*

> (i) in the form of a flat surface on the pin at the location where it contacts the chip carrier in the case of the pins illustrated in Plaintiff Exhibit 177 corresponding to Defendant's Exhibit D-4, and
>
> (ii) in the form of a radius which contacts the chip carrier in the case of the pins illustrated in Plaintiff Exhibit 181 corresponding to Defendant Exhibit D-5.

Pfaff asserts that Mr. Midili agrees that the curved radius surface would be within the definition of *inwardly converging*.

> Q. Are there inwardly converging portions of that edge on the radius as you've defined it?
>
> A. If you go along point to point on the radius, it would – that radius extends inward.[58]

This court notes that the remaining member of the Category D sockets with pins illustrated by Defendant Exhibit D-6 have a radius contacting the chip carrier and holding it in place as can be seen in more detail in Plaintiff Exhibit 155 which radius is similar to the radius in Defendant Exhibit D-5 pins.

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[57] Trial transcript in this case, page 422, lines 3-12.

[58] Trial transcript in this case, page 596, lines 1-4.

Pfaff presented evidence through its technical expert, Mr. Gastine that all of the accused Wells sockets in this case meet the *converging or inclining inwardly* language of independent claims 1, 7, and 19.[59]

Pfaff also refers to the deposition testimony of Mr. Carter, designer of the Wells Category A type of pin illustrated in Defendant's Exhibit D-1.

Q. That's where the contact pin makes contact with the J lead or straight lead on the package. Is that correct?

A. That's correct. Both along the radius itself and the run-out area underneath

Q. The purpose of that radius area is to make electrical contact?

A. Correct.

Q. Does it have another function?

A. No.

Q. Does it in any way serve to maintain the package within the socket?

A. The pressure of the contact on the socket maintains it. So, the answer is Yes.

Q. So, it does exert some pressure on the leads of the device package to maintain the device package in the socket?

A. That's correct.

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[59] Trial transcript in this case, pages 124, 132, 149, 154, 167, 183, and 204.

Q. Is that pressure exerted from – What direction is that pressure exerted from when the device is closed?

A. In the view given, it would be primarily from right to left.

Q. Horizontally?

A. Primarily horizontal.

Q. When you say primarily, do I take it from that there are other vector forces involved?

A. Yes. Depending upon where you pick up the radius and the run-out area, there would be generated, again dependent upon the angle of incidence, some downward force. That would be rather low compared to the horizontal force.

Q. But, there is intended in this design that the radius area does apply some downward force. Is that correct?

A. The primary objective of the design was retention in the socket. So, in order to not have the cake-of-soap situation where you would exert an ejecting force, the force should be horizontal to downward rather than horizontal to upward.[60]

The pins in all of the sockets in this case avoid the cake-of-soap problem referred to in Mr. Carter's deposition testimony.

Wells, on the other hand, asserts that the language in claim 1 "the inner edges of said pins converging slightly

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[60] Deposition testimony of Carter, Plaintiff Exhibit 207, page 25, line 1 through page 26, line 17.

inwardly with distance from said first major face" must have a *continuous, positive slope* as found in the Pfaff patent. While the Pfaff patent illustrates in the drawings (see Figures 4 and 5 above in Section 2) pin blades 20b which have an inwardly sloping edge continuous except for the barb 51a for an appreciable distance above and below the chip carrier 10, there is nothing in the claims that requires that there be an extensive continuous inwardly inclining slope over a large portion of the inner edge of the pin. The only operative portion of the pin is the point which makes contact with the chip carrier in order to make electrical contact and to hold the chip carrier down in place.

This court finds that at least a portion of each of the pins in the six sockets accused of infringement in this case have a shape which satisfies the *inwardly inclining* language contained in independent claims 1, 7, and 19.

5d. Are The Wells Sockets For Leadless Chip Carriers?

Each of the independent claims 1, 7, and 19 of the Pfaff patent begin by reciting on the first line thereof "Mounting means for a leadless chip carrier comprising: . . . ". The Indiana Court set up a definition of a leadless chip carrier (although referring to it as a "leaderless" chip carrier occasionally).

> In the state of today's semiconductor art, a multiple of electric components or circuits can be etched in a silicon wafer, commonly referred to as an integrated circuit, which is housed within a ceramic or plastic carrier for protection. Integrated circuits conventionally are housed in dual in-line packages having interconnection

> leads adapted for attachment by insertion through printed circuit boards. The leads of such packages or carriers assume a variety of configurations, such as L-shapes and J-shapes. During recent years, in response to the need for high-density packaging for integrated circuit devices, the industry has developed a package that dispenses with the need for conventional leads in favor of lands, or contact pads, around the periphery of a square or rectangular ceramic or plastic housing known in the art as leadless chip carrier.[61]

The Indiana Court continues to define leadless chip carrier in footnote 1.

> Some leaderless chip carriers actually have small J-type leads that wrap around an edge of the carrier and are adapted for surface mounting of the carrier on a printed circuit board rather than insertion through the circuit board. More precisely, "leaderless chip carrier" is a term of art designating a surface-mountable chip carrier.

Pfaff contends that the Indiana Court definition of leadless chip carrier was essential to this court's judgment and therefore is entitled to "collateral estoppel effect" as to the construction of that term used in the preamble of the Pfaff patent claims. On the other hand, Pfaff also urges that statements of intended use in the preamble of a claim are not limitations, citing *Lactate Corporation v. Altricial, Ltd.*, 781 F.2d 861, 228 USPQ 90, 94

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[61] *Pfaff v. Wells Electronics, Inc.*, 9 USPQ2d at 1367 (N.D. Ind. 1988).

(Fed.Cir. 1985). Pfaff says the preambles of the Pfaff patent claims are statements of intended use and, therefore, are not claim limitations. That this language is a mere statement of intended use is shown by the context in which it is used and by the fact that the U.S. Patent and Trademark Office during the Pfaff patent prosecution asserted against these claims prior art sockets for use on carriers that are unquestionable not leadless chip carriers. In fact, Wells also asserted prior art sockets against the Pfaff patent claims even though the prior art sockets were not intended for use with leadless chip carriers. According to Pfaff therefore, even if the Wells sockets accused of infringement in this case are used for carriers that are not leadless chip carriers, nevertheless infringement would not be avoided simply because of the statements of intended use in the preamble of the Pfaff claims.

Pfaff contends that all of the Wells sockets accused of infringement in this case are intended for use in testing and burn-in of surface mounted chip carriers. Specifically, Category A sockets are intended for use with J-lead devices which are surface mounted.[62] The Category B and Category C sockets are intended for use with gullwing devices which are also surface mounted.[63] The remaining Category D sockets are used for J-lead or carrier-ring devices which are surface mounted.[64] Mr. Mangum, the

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[62] Mr. Midili trial testimony in this case, page 501, lines 16-20.

[63] Mr. Mangum trial testimony in this case, page 33, lines 5-10.

[64] Mr. Midili testimony in this case, page 426, line 5 through page 427, line 11.

owner of a business for burning in chips, testified that the term "leadless chip carrier" includes surface mountable devices with leads.[65] Examples of the J-lead, gullwing, carrier ring and other types of chip carriers including the "dead bug" and "live bug" variety are shown on Plaintiff's Exhibit 10.

Mr. Pfaff, the inventor, testified in this case that

> A. A leadless chip carrier is – as used – it's common terminology in the industry – is a chip that is in a package where the package leads do not need to go through the circuit board to be soldered in. It's a surface mount device, a chip carrier that solders to the top of the board as opposed to through-hole technology where it solders through the board.[66]

Wells contends that the accused devices are not used with leadless chip carriers. The Indiana Court made inconsistent statements. At first, the Indiana Court explained that a leadless chip carrier has *no leads*, instead it uses terminal lands, or contact pads. Then the Indiana Court stated that some "leaderless [sic] chip carriers" have *J-type leads*. Finally, the Indiana Court concluded that a "leaderless [sic] chip carrier is . . . a surface mountable chip carrier." In a few short sentences, the Indiana Court stated that a leadless chip carrier does not have leads, may have leads, and is simply a surface-

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[65] Mr. Mangum testimony in this case, page 30, line 14 through page 31, line 13; page 106, line 15 through page 107, line 12.

[66] Mr. Pfaff's testimony in this case at page 88, lines 4-20.

mountable chip carrier. Wells points out that the independent claims say "mounting means for a *leadless* chip carrier," not "mounting means for a *surface-mountable* chip carrier".

Wells also points out that one particular Wells model, number 642 represented by the pin shape in Exhibit D-1 of Category A was intended for use with straight lead applications. Mr. Midili testified that Wells designed this socket for the straight leaded chip carrier which he called dual in-line type, but that it could be used for a J-lead type if someone chose to do that.[67]

This court having heard the testimony and reviewed the Exhibits in this case arrives at the same definition for *leadless chip carrier* that was found by the Indiana Court. Accordingly, this court finds that all six types of sockets accused of infringement in this case, Category A through Category D are intended for use with leadless chip carriers as defined by the Indiana Court.

5e. Did The Wells Category B And Category C Sockets Have Barbs On The Inner Edges Of The Pins?

Dependent claim 11 recites "Mounting means as defined in claim 7 wherein the inwardly inclined edges of said contact means include an inwardly projecting barb." Claim 19 includes a final sub-paragraph (d) which recites "barb means projecting inwardly from the inwardly inclined edges of said contact means."

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[67] Mr. Midili, President of Wells, testimony in this case, page 701, lines 21-24.

With reference to Figures 4 and 5 from the Pfaff patent as shown in Section 2 above, the specification at column 5, line 56 states that:

> In the embodiment of FIGS. 4 and 5 the outwardly divergent edge 51 of blade b is modified to include an outwardly and downwardly extending barb a. Thus, when the spreader cap 40 is depressed, the blades b are withdrawn laterally to permit the leadless chip carrier to be deposited within the cavity. However when the spreader cap 40 is released, the blades b move inwardly urging barbs a inwardly and downwardly into contact with the top surface of the lands 11. Since barbs a move both laterally and downwardly when the blades b are released, the barbs a scrape the surface of the lands 11 to remove any oxidation therefrom and thus form good electrical contact with the lands 11 while also acting to retain the leadless chip carrier within the cavity.

There was no assertion that there were barbs on the pins in the sockets accused of infringement in the Indiana Court, and claims 11 and 19 were not at issue in the Motion for Summary Judgment in this court. Accordingly, no prior proceedings contain references to the barb limitation in claims 11 and 19.

Pfaff charges the Category B and Category C (see Section 5b. for illustrations) sockets with infringement of claims 11 and 19.[68] Pfaff asserts that the proper construction of this claim element is that the *barb* in claims 11 and

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[68] Category B socket pins are illustrated in Defendant Exhibit D-2 and include Wells Model Nos. 653 and 663; Category C sockets have pins illustrated by Defendant Exhibit D-3 and include Wells Model Nos. 648, 649, 652 and 653.

19 means any inner edge of the pins which projects inwardly and downwardly, citing the portion of the Pfaff patent in Column 5 above. The function of the barb element is to move inwardly and downwardly to contact the carrier upon release of the spreader.

Pfaff's patent law expert, Mr. Grossman, testified that there is nothing in the claim language which requires that the barb scrape the chip carrier conductor. "There is no function assigned to that structural element."[69]

Wells contends that its Category B and Category C sockets do not have pins which include a barb means projecting inwardly from the inwardly inclined edges of the pins. Wells cites a common dictionary definition for *barb*, "a point or pointed part projecting backward from a main point, as of a fish hook, an arrow, or the like."[70] Wells contends that the illustration of the barb 51a in Figures 4 and 5 of the Pfaff patent with its sharp triangular shape, jutting outwardly and downwardly from the Pfaff blade, fits quite naturally into this standard definition of a barb. In contrast, the term *barb* would have to be interpreted overly broad to encompass the corners of the pins in the Wells sockets charged with infringement.[71] First, none of the corners of the pins are sharp. Every angle of every pin has a radius. Second, although the

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[69] Mr. Grossman testimony in this case, page 913, line 12 through page 915, line 3, and page 931, line 2 through page 933, line 15.

[70] *Webster's Encyclopedic Unabridged Dictionary* 118 (1989).

[71] Categories B and C shown in Defendant Exhibit D-2 and D-3.

corner of each pin constitutes the innermost extending curve of the pin, these corners do not protrude from the main body of the pin to form a separate, barb-like shape. Rather, such rounded corners are integral to the overall pin shape. Third, none of the corners project backward from a main point, like a fish hook, an arrow head or Pfaff's barbs. None of the pins have a main point from which the barb could project. Each of the Wells corners is simply one surface of a relatively compact portion of the upper section of the pin.

Wells goes on to argue that furthermore, even if the corners of the accused pins could somehow be considered to be *barbs*, the pins do not infringe (i) claim 19, because the corners do not "project inward from the *inwardly inclined edges*" of the pins, and (ii) claim 11 because the pins do not have "inwardly inclined edges and a barb means associated with it."[72] In finding that the pins in the Category B and C sockets contained inwardly inclining edges as defined in claim 7 (on which claim 11 depends) and claim 19, this court found in Section 5c. that the rounded corner of the pins contacting the chip carrier are the inclined edges satisfying the claim limitation. Having found that the radius is the element of the pin satisfying the "inclined edge" limitation in sub-paragraphs (b) of claims 7 and 19, it is then necessary to find (i) structure that projects inwardly from such "inclined edge" as called for in claim 19, and (ii) an inwardly projecting barb included in the inwardly inclined edges of said contact means as called for in claim 11.

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[72] See page 39 of Defendant's Post-Trial Brief.

The court finds no structure exists in the Wells pins that satisfies the limitation in this claim 19. The radius on the edge of the pin which contacts the chip carrier is the inclined edge in claim 19 (see illustrations of Category B and Category C in Section 5b.). This claim unambiguously calls for the barb to be a projection on the inwardly inclined edge. There is no projection on the radius on the edge of the pin. There is no barb on the inclined edge of the pin as called for in claim 19. Accordingly, the court finds that claim 19 is not literally infringed by the Wells sockets.

The scope of claim 11 is different from claim 19 in that claim 11 recites that the barb is "included" in the inwardly inclined edges of the contact means and not projecting inwardly from the inwardly inclined edges as called for in claim 19. The court finds that Wells' Category B and Category C sockets have inwardly inclined edges of the contact means including an inwardly projecting barb, using the term "barb" as described in the specification at column 5, line 56 through line 64, and further based on the testimony of Pfaff's expert appearing in the transcript of this trial page 914 line 9 through page 915 line 3. The court does not construe the term "barb" to require that it include a pointed part projecting backward from the main point such as a fishhook or arrow as asserted by Wells based on the common dictionary definition.

In summary, the court finds that Wells Category B and Category C sockets have "barbs" that literally fall within the scope of the "barb" language in claim 11, but not claim 19.

5f. Do The Wells Pins Have An Axis Aligned Parallel To Each Other And Normal To The Base?

Claims 7 and 19 each have the following limitations:

> (b) A plurality of axially elongated contact means mounted within said support housing and extending therethrough with their axes aligned parallel to each other and normal to said first and second major faces, . . .

Wells asserts that the overall shape of its pins are relatively complex, with various segments extending in multiple directions, and as a result, no clearly identifiable axes can be determined. Accordingly, its pins cannot literally meet the language requiring that their axis be parallel to each other and normal to the base. This court finds that this is too narrow a construction for this language limiting it to the simple shape of the blades shown in Figures 4 and 5 of the Pfaff patent. The specification of the Pfaff patent contains an acknowledgement of the simplicity of its design.

> It should be noted that the structure of the embodiment described is extremely simple and may be readily fabricated from available materials. For example, the housing may be made from three pieces of insulating materials such as molded or machined plastic or the like. The pins 20 are symmetrical about their longitudinal axis (except for the lengths of shanks 20d and studs 20e), thus may be all identical and simply alternately reversed during assembly to project parallel rows of pins.[73]

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[73] Pfaff patent column 6, line 3-11.

This simplicity of design should not be read into the claims as a limitation.[74] This court finds that all of the accused Wells sockets have pins that do contain a longitudinal axis (although the pins are not symmetrical about their axis) and that the axis of each pin is aligned parallel to each other and normal to the first and second major face of the support housing.

5g. Do The Wells Sockets Have Spreaders With Surfaces Inclined With Respect To The Axis Of The Pins?

Claim 7 and claim 19 have language in sub-paragraph (c) requiring that " . . . said spreader means having a surface inclined with respect to the axes of said contact means . . . ". Wells says the contact means have no identifiable axis and accordingly this claim cannot be literally infringed. This court has disagreed with Wells in the preceding Section regarding the presence or absence of an axis for the contact means. This court finds that the spreaders in the sockets charged with infringement in this case all have surfaces inclined with respect to the axes of the contact means.

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[74] *Lockheed Aircraft Corporation v. United States*, 193 USPQ 449, at 458 (Ct. Cl. 1977). *SRI International v. Matsushita Electric Corp. of American*, 227 USPQ 577 at 585 (Fed. Cir. 1985) (in banc). *Sjolund v. Musland*, 6 USPQ2d 2020 at 2027.

5h. Do Wells Spreaders Mate With The Inclined Inner Edges That Define Cavity?

Wells points out that claim 7 (as well as claim 19) includes language in sub-paragraph (c) requiring that the "spreader means . . . mat[e] with said inclined inner edges of said contact means. . . . " Wells contends that the spreaders mate with the outwardly extending arm of the pins rather than the inner edge defining the cavity. This court has already found that the spreader contacts the inner edge of the pin notwithstanding Wells assertion that this inner edge is located on an outwardly extending arm. Accordingly, this court finds that this limitation in claims 7 and 19 is met by the Wells sockets.

5i. Do The Wells Spreaders Mate With The Ends Of The Pins As Required In Claim 6?

Claim 6 is dependent upon claim 1 and adds further limitations including a " . . . camming means for mating with the ends of said pins. . . . " Wells contends that because of the rounded shape of the pin arm, no "mating" between the spreader and the pin arm occurs. This court finds no reason why a rounded portion of the pin arm does not "mate" or coact with the spreader to spread the pins. Wells has supplied no explanation. This court finds this limitation in claim 6 to be met by the accused Pfaff sockets.

5j. Do The Category B Wells Sockets Have A Centrally Located Aperture In The Housing As Called For In Claim 10?

Dependent claim 10 calls for " . . . a centrally located aperture in said support housing." The Pfaff patent describes this feature at column 6, lines 31-38.

> Removal of the leadless chip carrier 10 from the housing is accomplished with similar ease. By pressing the spreader cap 40 toward the intermediate support housing 16, the blades 20b are retracted and the leadless chip carrier may be withdrawn from the housing by simply inverting the structure; by inserting a plunger or other suitable instrument through the aperture 13; or by other suitable simple and convenient means.

Wells contends that its Model 663, one of the Category B sockets, illustrated generally by Defendant Exhibit D-2 and specifically by Defendant Exhibit E-9 and Plaintiff Exhibit 175 lacks a centrally located aperture in the base. This court agrees that Wells Model 663 does not infringe claim 10. All the other models have apertures in the base and are found to fall within the scope of the aperture language in claim 10.

5k. Do The Wells Spreaders Have Reciprocal Movement As Called For In Claim 6?

Claim 6 requires that the spreader be " . . . adapted for reciprocal movement parallel with the axis of said pins. . . . " Wells contends once again that none of its pins have an axis, and accordingly the spreader cannot have the appropriate reciprocal movement. This court finds

that the Wells spreader clearly moves up and down in the same fashion as the preferred embodiment described and illustrated in the Pfaff patent. The Wells accused sockets cannot avoid infringement because of this limitation in claim 6.

5l. Does The Wells Category A Spreader Have A Central Cavity Larger Than The Area Defined By The Pins As Set Forth In Claim 6?

Dependent claim 6 requires that the " . . . means for spreading the ends of said pins comprises a rectangular body . . . having a central cavity therein greater in lateral dimensions than the lateral area defined by the pins . . . ". Wells points out that its Model 642 having pins illustrated by Defendant Exhibit D-1 and further illustrated in Defendant Exhibit E-1 and Plaintiff Exhibit 150 does not meet this limitation in claim 6. This court finds that Wells' Model 642 does not infringe claim 6 because of this limitation. All other models accused of infringement in this case are found to fit within the scope of this limitation of claim 6.

5m. Are The Wells Pins Arranged With Their Inner Edges Defining A Cavity Which Is Rectangular In Dimensions?

Claim 7, paragraph (b) calls for "the free ends of said contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimensions . . . ". The rectangular shape is also called for in paragraph (c) of claim 7 "unitary spreader means comprising a substantially rectangular body . . . ". Claims 10 and 11 are dependent upon claim 7, and similar

limitations appear in independent claim 19. These claims call for the inner edges of the pins to define a rectangular cavity. Six of the nine Wells devices do not have pins arranged to define a rectangular cavity. Instead, they have only two parallel rows of conductive pins. The court finds that the inner edges of two parallel rows of conductive pins cannot define a rectangular cavity.

On the other hand, those Wells devices that have four rows of conductive pins arranged in a rectangular shape do fall within the rectangular language in claims 7 and 19.

The following table illustrates the Wells model numbers accused of infringement, the pin arrangement for each model, and the exhibits that illustrate the pin arrangement.

RECTANGULAR CAVITY

WELLS MODEL	PIN ARRANGEMENT	EXHIBIT
642	Two Sides	Plaintiff's Exhibit 150
653	Four Sides	Plaintiff's Exhibits 173, 183 & 184
663	Two Sides	Plaintiff's Exhibit 175
648	Two Sides	Plaintiff's Exhibit 157
649	Two Sides	Plaintiff's Exhibit 160
652	Two Sides	Plaintiff's Exhibit 164
667	Four Sides	Plaintiff's Exhibit 176
647	Four Sides	Plaintiff's Exhibit 154
668	Four Sides (one size)	Plaintiff's Exhibit 179
668	Two Sides (remaining sizes)	Plaintiff's Exhibit 182

The court finds no literal infringement of claims 7, 10, 11 and 19 by Wells Model 642 in Category A; Model No. 663 in Category B; Model Nos. 648, 649 and 652 in Category C; and Model 668 in Category D except for one size of Model 668 illustrated in Plaintiff's Exhibit 179. The remaining Wells Models 653, 667, 647 and the one size of Model 668 illustrated in Plaintiff's Exhibit 179 fall within the scope of the rectangular language in independent claims 7 and 19.

6. Infringement by the Doctrine of Equivalents

Under the doctrine of equivalents, an accused product that does not literally infringe a structural claim may infringe "if it performs substantially the same function in substantially the same way to obtain the same result." *Graver Tank and Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 85 USPQ 328 at 330 (1950); *Hughes Aircraft Company v. United States*, 717 F.2d 1351, 219 USPQ 473 (Fed. Cir. 1983). The doctrine of prosecution history estoppel prevents a patentee from relying on the doctrine of equivalents when the applicant "was forced to narrow or restrict his patent's claims through amendment to convince the examiner of the device's patentability. . . . " *Pfaff v. Wells Electronics*, 9 USPQ2d 1366 at 1370 (N.D. Ind. 1988), citing *Lactate Corp. v. Altricial, Ltd.*, 781 F.2d 861, 228 USPQ 90 (Fed. Cir. 1985). Prosecution history is used to determine the range of equivalents that a patent should be allowed. Prosecution history estoppel will not allow the patentee to recapture through equivalents certain coverage surrendered during prosecution. *Lactate Corp. v. Altricial Ltd.*, 781 F.2d 861, 228 USPQ 90 (Fed. Cir. 1985).

The Indiana Court dealt with the doctrine of equivalents on the same Pfaff patent in litigation between the same parties.

> Wells contends that the doctrine of prosecution estoppel precludes Mr. Pfaff from the benefit of the doctrine of equivalents with respect to the Wells device. The Court concurs with Wells' contention.[75]

The Indiana Court concluded that

> Thus, during the prosecution of his patent application, Mr. Pfaff amended Claim 1 to include the term "axially elongated" with reference to the conductive pins, and to add the phrase "coacting with said inner edges of said pins" in reference to the spreader means. Claims that Mr. Pfaff amended to distinguish them from prior patents are those that preclude a finding of literal infringement. Mr. Pfaff cannot now contend that the Wells pins, with their return bent parts, are equivalent. He cannot now contend that the Wells device, in which the spreader coacts with the arms extending from the pins, are equivalent. The doctrine of prosecution estoppel precludes resort to the doctrine of equivalents.[76]

The Court of Appeals for the Federal Circuit affirmed

> We agree with the district court that Pfaff was precluded by prosecution history estoppel from construing as equivalents Wells' pins with

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[75] *Pfaff v. Wells Electronics, Inc.*, 9 USPQ2d at 1370 (N.D. Ind. 1988).

[76] *Pfaff v. Wells Electronics, Inc.*, 9 USPQ2d at 1371 (N.D. Ind. 1988).

> return bent parts and spreader means coacting with arms extending from the pins. In overcoming the *Pauza* and *Anhalt* references, Pfaff amended his claims, adding "axially elongated" to limit his pins and "inner edges" to limit the structure defining the cavity. Pfaff's claim interpretation would thus resurrect subject matter surrendered.[77]

In the present case, the Court of Appeals for the Federal Circuit reviewed this court's granting of a Motion for Summary Judgment on the issue of whether or not the spreader contacts the inner edges of the pins which form the cavity. With regard to this single issue of infringement, the Federal Circuit briefly addressed the doctrine of equivalents.

> In light of our discussion above, which vacates the summary judgement of non-infringement on the grounds of literal infringement, we need not address this issue in depth. Wells is correct that, in affirming an Indiana Court we agreed that the phrase "coacting with said opposed inner edges of said pins" was a limitation added to claim 1 to distinguish over the prior art. In that case, we stated that Wells' spreaders, which coacted with arms extending laterally from the pins, could not be construed as equivalents because they contacted "outer edges" of the pins. However, in this case, there remains a material factual dispute as to whether the accused spreaders coact with the "inner edge" that define the cavity or an "outer edge" that does not. The existence of this question,

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[77] *Pfaff v. Wells Electronics, Inc.*, 12 USPQ2d at 1159 (Fed. Cir. 1989).

which renders summary judgement on the literal infringement issue improper, likewise renders summary judgement improper on whether the accused spreaders infringe under the doctrine of equivalents.[78]

6a. Do The Wells Sockets Infringe Under The Doctrine Of Equivalents The Limitations In The Pfaff Claims Calling For The Spreader To Contact The Inner Edges Of The Pins Forming The Cavity

This court has found in Section 5a. analyzing literal infringement, that the sockets charged with infringement in the present case have pins whose inner edges coact with the spreader and define the cavity. The top of the pins are not designed to contact the spreader. The accused sockets in the Indiana Court have pins that are designed to make vertical contact with the spreader. With regard to this specific design feature the pins in this case are different. The prior claim interpretation in the Indiana Court does not have issue preclusive effect in this case.[79]

Under the doctrine of equivalents a patentee must show that the accused device "performs substantially the same function in substantially the same way to obtain the same result" *Graver Tank & Mfg. Co. v. Linde Air Prods. Co.*, 339 U.S. 605, 608, 85 USPQ 328, 330 (1950).

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[78] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1124 (Fed. Cir. 1993).

[79] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1122 (Fed. Cir. 1993).

Wells contends that its sockets do not spread the contact pins in the same way that the Pfaff patent discloses. Referring first to the accused devices in the Indiana Court illustrated in the drawing in Section 5a. above for the device shown in Defendant Exhibit C-2, the lid contacts the top of the pin producing a rotational movement or rolling action of the contact. Thus, the pins in the Wells device accused of infringement in the Indiana Court moves laterally or outward causing the contact at the chip carrier to rotate away from the chip carrier. With regard to each of the six sockets accused of infringement in this case, the spreader produces both lateral and vertical forces on the pin with the vertical component producing a rotational movement of the pin. This vertical component and accompanying rotational movement produces the same rolling action that was achieved in the sockets accused of infringement in the Indiana Court. Thus, the pins in the Wells sockets accused in the present case are subject to two forces, namely, a lateral force which pushes the contact laterally or outwardly, and a downward force which causes the contact at the carrier contact point to rotate away from the chip carrier. According to Wells this rotational movement is different from the substantially pure lateral movement of the pin disclosed in the Pfaff patent. This vertical component of force enables the Wells device to accommodate leads extending from the chip carriers. Indeed, Pfaff has recently introduced a sweeping, return bent, shortened pin, having many of the characteristics of the Wells return

bent contacts illustrated in Defendant Exhibit D-2 and shown in Section 5a. above.[80]

Wells continued with his argument that due to the location of the spreader to pin contact point being almost directly over the pin to carrier contact point along Pfaff's axially elongated pins shown in the patent, the force exerted by the spreader upon the pins is more of a pushing force, pushing the pin outward. In contrast, the lateral displacement or offset of the chip to pin contact point from the pin to the carrier contact point, which is present in each of the Wells socket devices, produces more of a pulling action which moves the spreader to pin point both outwardly and downwardly so as to produce the rotational action experienced by the Wells contacts in both the Indiana devices, and the devices in the present case. Wells contends that this operation is different and accordingly his sockets operate in a different way from that disclosed in the Pfaff patent.

This court has held in Section 5a. that there is literal infringement of the portions of claims 1, 7 and 19 that require that the spreader coact with the inner edges of the pins defining the cavity. This coaction performs the function of spreading the pins so that the chip carrier can be dropped into the cavity.[81] The Wells devices accused of infringement in the Indiana Court and the Wells devices

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[80] Mr. Pfaff testified in this case on pages 99-102 describing a "new QFP socket" illustrating a pin shape in Defendant Exhibit AAA very similar in appearance and shape to the pin illustrated in Defendant Exhibit D-2 a Category B type socket.

[81] See column 4, lines 51 through column 5, line 11 of the Pfaff patent.

accused of infringement in this case perform the same function. In the Indiana Court the accused sockets performed this function by pressing a lid down on the top of the pin and not on the inner edge of the pin to produce only a vertical component of force. However, the accused sockets in this case all have the lid arranged so that it contacts the inner edge of the pin to produce not only a vertical component of force, but a horizontal component of force. Clearly the Pfaff patent discloses a coaction between spreader and pin which produces both a vertical and horizontal component of force on the pin, but since the pin design disclosed in the preferred embodiment in the Pfaff patent is rigid in the vertical direction resisting downward motion, the predominant motion of the pin in the preferred embodiment of the Pfaff patent is laterally in response to the horizontal force created by the spreader. The claims in the Pfaff patent of course are not limited to the preferred embodiment disclosed in the specification and drawings.[82] Changing the shape of the pin design to permit vertical motion of the pin and moving the contact point between spreader and pin laterally from the contact point between the chip carrier and the pin does not produce a new function, or a new way of performing that function. It may be an improvement because of the enhanced amount of lateral movement of the pin away from the chip carrier, but the accused Wells sockets perform the same function in substantially the same way that is claimed in the Pfaff patent.

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[82] *Lockheed Aircraft Corporation v. United States*, 193 USPQ 449, at 458 (Ct. Cl. 1977). *SRI International v. Matsushita Electric Corp. of American*, 227 USPQ 577 at 585 (Fed. Cir. 1985) (in banc). *Sjolund v. Musland*, 6 USPQ2d 2020 at 2027.

Accordingly, this court finds that all of the accused Wells sockets infringe under the doctrine of equivalents as well as literally infringe the portion of claims 1, 7 and 19 calling for the spreader to contact the inner edges of the pins forming the cavity.

6b. Do The Wells Sockets Infringe The Language In The Pfaff Claims Requiring Axially Elongated Conductive Pins Under The Doctrine Of Infringement?

The Indiana Court found that the *axially elongated* amendment to claim 1 of the Pfaff patent[83] gave rise to the doctrine of prosecution history estoppel which in turn precludes resort to the doctrine of equivalents. The Federal Circuit agreed.[84]

This court has found in Section 5b. that the accused Wells sockets in Category A through Category D have *axially elongated* conductive pins. These pins are not identical in shape to the shape of the pins before the Indiana Court, and therefore the Indiana Court claim interpretation has no issue preclusive effect in the present case, either with regard to literal infringement or with regard to infringement under the doctrine of equivalents.[85]

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[83] Claim 7 of the Pfaff patent as originally filed already included this language and claim 19 presented for the first time after the second Office Action included this language.

[84] See discussion in the immediately previous Section 6a analyzing the same prosecution history estoppel issue with regard to the *inner edges* claim language.

[85] *Pfaff v. Wells Electronics, Inc.*, 28 USPQ2d at 1122 and 1124 (Fed Cir. 1993).

This court has reviewed Wells contentions set forth in the previous Section 6a. with regard to the *inner edges* claim language and has applied it to the *axially elongated* claim language analyzed in this Section 6b. The Category A through D Wells sockets have pins with a shape which permits both vertical and horizontal motion in response to the spreader cap forces. The Pfaff *axially elongated* pins in the preferred embodiment disclosed in the specification and drawings of the Pfaff patent have a shape which reacts predominately to the horizontal force produced by the downward motion of the spreader cap and reacts little, if any, to the vertical force produced by the spreader cap. Wells' contention more fully set forth in the preceding Section 6a. is that the presence of the ability to react to both components of force produced by the spreader cap results in achieving the same function as the Pfaff invention, but achieves that function in a different way.

This court cannot agree. The *axially elongated* shape of the pins in the Category A through Category D Wells sockets permits, indeed is necessary and essential for permitting the horizontal motion of the pin away from the chip carrier. Each of the Category A through Category D Wells pins have an *axially elongated* shape which permits the pins to be spread outwardly by the spreader cap to allow the chip carrier to be dropped into the cavity with zero insertion force. The Wells sockets in Categories A through D perform the same function in the same way as that described in the Pfaff patent, notwithstanding that such Wells sockets may also have an enhanced feature allowing a greater amplitude of horizontal motion of the

pin away from the chip carrier in response to the vertical component of force produced by the spreader.

In summary, this court finds with respect to claims 1, 7 and 19, that Category A through Category D Wells sockets have pins which are *axially elongated* when applying both a literal claim interpretation, and the doctrine of equivalents.

6c. Do The Wells Socket Categories B And C Have Pins With Barbs That Infringe Pfaff Claims 11 And 19 Under The Doctrine Of Equivalents?

Independent claim 19 calls for the inclusion of a barb projecting inwardly from the inclined edges of the pin, and dependent claim 11 calls for an inwardly projecting barb included in the inclined edges of the contact means. These claim limitations were not reviewed in any of the prior proceedings in the Indiana Court or in this case. This court has held in Section 5e. that claim 11 is literally infringed, but that claim 19 is not because while the pins have inclined edges, these inclined edges have no *barbs* projecting inwardly therefrom.

This court will therefore consider whether or not the *barb* limitations in claims 11 and 19 are infringed under the doctrine of equivalents. The function of the *barb* is defined in the Pfaff patent at column 5 beginning on line 64, "Since the barbs 51a move both laterally and downwardly when the blades 20b are released, the barbs 51a scrape the surface of the lands 11 to remove any oxidation therefrom and thus form good electrical contact with the lands 11 while also acting to retain the leadless chip carrier within the cavity." The latter function of retaining

the leadless chip carrier within the cavity is performed in the Pfaff patent by both the inwardly inclining edges of the pins and by the *barbs*. Horizontal movement of the leadless chip carrier is contained by the inwardly inclined edges, while vertical movement is restrained by both the barb and the inclined edges.

Wells argues that its accused pins do not perform the function of scraping the contact pad on the top of the chip carrier.[86] Pfaff's patent expert testified that there is nothing in the claims which requires that the barb scrape.[87] This court cannot find sufficient evidence that the Wells pins scrape the contact areas of the chip carrier, but the court also finds that claims 11 and 19 do not require that the barbs scrape. Further the court finds that the Wells pins in Category B and Category C (see Section 5b. for illustrations) perform the same function as the inclined edges to hold the chip carrier in place preventing both horizontal movement and vertical movement. Accordingly, the court finds that claim 11 is infringed both literally and under the doctrine of infringement.

The court does not find claim 19 infringed under the doctrine of equivalents or literally infringed. The doctrine of equivalents has been further defined since the *Graver Tank* case[88] to require that not only must there be a

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[86] Professor Bach, Wells' technical expert, agrees that the *barb* performs the hold down function at trial transcript page 800, lines 6-23, but denies that the devices perform the scraping function at trial transcript page 846, line 20 through page 847, line 8.

[87] Transcript page 914, lines 13 and 14.

[88] *Graver Tank & Mfg., Co. v. Linde Air Ads. Co.*, 339 U.S. 605, 85 USPQ 329 (1950).

substantial identity of the function, way and result for the device as a whole, but there must be substantial identity for each element of the device. *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 4 USPQ2d 1737 (Fed. Cir. 1987). This court has already found in Section 5e. that the *barb* limitation as particularly defined in claim 19 is missing from the pins in the accused Wells sockets in Category B and Category C. Specifically, there is no barb projecting inwardly from the inclined edges as recited in claim 19. Pfaff argues that claim construction does not require that there be a separate structure for the barb, separate from the inclined edges. Pfaff directs the court's attention to the following:

> One-to-one correspondence of components is not required, and elements or steps may be combined without *ipso facto* loss of equivalency. Each case must be decided in light of the nature and extent of the differences between the accused device and the claimed invention, on the equitable principles of the doctrine of equivalents.[89]

The court finds no difficulty in following Pfaff's claim construction as it applies to the language in claim 11, but cannot ignore the clear structural recitation in claim 19. Since the barb element structure as expressly defined in claim 19 is missing, the court is reluctant to find that the requisite function/way/result is performed by another element of the accused device, such as the inclined edges (rounded corners) in the Wells Category B and Category C sockets. Claim 19 clearly calls for the

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[89] *Sun Studs Inc. v. ATA Equipment Leasing Inc.*, 10 USPQ2d 1338, 1347, 872 F.2d 978 (Fed. Cir. 1989).

function/way/result to be performed by a barb projecting from the inclined edges (rounded corners).

In summary, the court finds that the Wells sockets in Category B and Category C infringe claim 11 both literally and under the Doctrine of Equivalents, and do not infringe claim 19 either literally or under the Doctrine of Equivalents.

6d. Do The Wells Pins Define A Cavity Rectangular In Dimensions That Infringe Under the Doctrine of Equivalents?

In Section 5m. the court found that Wells devices with two rows of pins do not literally infringe the language in claims 7 and 19 calling for "the free ends of said contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimensions . . . " and "unitary spreader means comprising a substantially rectangular body." The court finds no proof of insubstantial differences between the claim language and the accused products with regard to this rectangular claim language.[90] The court considers the rectangular claim language to be significant in distinguishing over the prior art.[91] It would not be an insubstantial change to modify the invention defined in claim 7 calling for a four-sided pin arrangement so that the accused device has only two rows of pins defining the cavity. This results in a substantial change in the function

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[90] *Hilton Davis Chemical Co., v. Warner-Jenkinson Company, Inc.* ___ USPQ2d ___ (Fed. Cir. 1995).

[91] See Sections 10a., 10c., and 11.

of the accused device since it no longer can accommodate the popular chip carriers with leads on four sides.

Accordingly, the court finds that the Wells sockets listed in Section 5m. that do not infringe claims 7, 10, 11 and 19 literally also do not infringe these claims under the doctrine of equivalents.

6e. Do The Wells Sockets Infringe Other Elements Of The Asserted Claims Under The Doctrine Of Equivalents?

This court has analyzed a number of other elements in Sections 5a. through 5l. dealing with literal infringement in addition to those elements of the claims analyzed in Sections 6a through 6c dealing with the doctrine of equivalents. Where the parties have raised issues involving the doctrine of equivalents in their pre-trial and post-trial briefs, the court has addressed those issues specifically in Sections 6a through 6c. Since the court has found that the Wells sockets accused of infringement in this case literally infringe certain other elements of the claims, it will not specifically address the question of infringement of each of those other elements under the doctrine of equivalents. The court finds that in each case where there is literal infringement of such other elements of the claim, the Wells sockets perform substantially the same function in the [sic] substantially the same way to achieve the same result as defined in such claim elements.

7. Conclusion Regarding Infringement

Based on the foregoing, the court concludes that:

(a) The Wells sockets in Categories B, C and D[92] fall within the scope of claims 1 and 6.[93]

(b) Wells Model 642, the sole socket in Category A, does not infringe claim 6 because the central cavity of the body is not larger than the lateral area defined by the pins.

(c) Wells Model 642, the sole socket in Category A, falls within the scope of Pfaff claim 1.

(d) Wells Categories B and C sockets have pins with inner edges, but those inner edges do not have *barbs* protruding therefrom. Accordingly, these sockets do not infringe claim 19.

(e) Wells Model 663, one of the two models in Category B, does not infringe claim 10 since it does not have a centrally located aperture in the housing thereof. All other models in Category A through Category D are found to fall within the aperture language in claim 10.

(f) Wells Model 653 in Category B, Model 667 in Category D, Model 647 in Category D, and one size of Model 668 in Category D illustrated in Plaintiff's Exhibit 179 infringe claims 7 and 10. Model 653 is also charged with infringement of claim 11 and does so.

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[92] Categories B, C and D Wells sockets include Wells Model Nos. 653, 663, 648, 649, 652, 667, 668 and 647.

[93] Claims 1 and 6 are found to be invalid, see Section 10c.

All other Models have two parallel rows of pins and do not infringe claims 7, 10 or 11, and at least for the same reason do not infringe claim 19.

VALIDITY

8. Wells Contentions Regarding Validity

Wells argues that the patents in suit are invalid for three reasons. First, the Pfaff invention was placed on sale in this country more than one year prior to the date of application for patent. Second, the Pfaff patent is invalid based upon prior art. Third, certain claims of the Pfaff patent are invalid for failing to particularly point out the subject matter which Pfaff regards as the invention.

35 U.S.C. § 282 provides that, "a patent shall be presumed valid . . . the burden of establishing invalidity of a patent or any claim thereof shall rest on the party asserting such invalidity." To overturn a patent, the attacker must convince the court of invalidity by clear evidence.[94] Accordingly, Wells bears the burden of showing invalidity by clear and convincing evidence.[95]

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[94] *American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1360, 220 USPQ 763, 770 (Fed. Cir. 1984).

[95] *Alco Standard Corp. v. Tennessee Valley Authority*, 808 F.2d 1490, 1498, 1 USPQ2d 1337, 1342 (Fed. Cir. 1986).

9. On Sale

35 U.S.C. § 102(b) provides as follows:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States. . . .

The Pfaff application was filed on April 19, 1982 and therefore the critical date for purposes of the "on sale" bar is April 18, 1981. The following sequence is not in dispute. Late in the year of 1980, Mr. Wayne Pfaff was called by Texas Instruments and thereafter Mr. Pfaff sat down with representatives of Texas Instruments and was asked to develop a socket for its carriers. A sketch was made by Mr. Pfaff at that meeting of his socket concept. A company called Delta V. on behalf of Texas Instruments issued a purchase order[96] to Pfaff's company, Plastronics. This purchase order was dated April 8, 1981 and was a confirmation of an earlier verbal order of March 17, 1981. The purchase order references a Plastronics drawing No. P2020,[97] and was for 30,100 sockets. These sockets were intended for production use by Texas Instruments.[98]

As is apparent from a review of the Plastronics engineering drawings[99] Pfaff completed detailed engineering drawings of the patented concept even before the formal

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[96] Defendant Exhibit BZ.

[97] Defendant Exhibit BHA.

[98] Defendant Exhibit BM.

[99] Defendant Exhibits BD, BE, BF, BG, BH and BHA.

written purchase order of April 8, 1981 was issued. In fact, several of the engineering drawings by Pfaff were completed before the verbal order of March 17, 1981 which is referred to in the Delta V. written purchase order. Pfaff stated in a deposition[100] that he completed his engineering drawings in approximately one week. The drawings were then sent to a company called Weiss-Aug which was to turn-key or produce the sockets on behalf of Pfaff. Weiss-Aug completed at least one of its drawings prior to the critical date of the patent in suit.[101] During Mr. Pfaff's deposition he indicated that it is not his practice to produce prototypes since he goes strictly from drawings to hard tooling "that's the way I do my business."[102] In response to the question of whether when Mr. Pfaff came up with his initial drawings was his idea going to work, Mr. Pfaff stated: "It functions."[103] Mr. Pfaff indicated that his contract with Delta V. on behalf of Texas Instruments after finishing his drawings in late 1980 or very early 1981 was a "go" situation.[104] In response to the question, "You had a good enough working relationship that you had a 'deal'?", Mr. Pfaff responded, "Oh, yeah."[105]

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[100] Defendant Exhibit BO, at page 55.

[101] Defendant Exhibit BA.

[102] Defendant Exhibit BO, on page 57.

[103] Defendant Exhibit BO, at page 58.

[104] Defendant Exhibit BO, page 58.

[105] Defendant Exhibit BO, on page 59.

The products received by Pfaff from Weiss-Aug in July of 1981 were eventually shipped to Texas Instruments and were accepted and used.[106] The Plastronics drawings which are prior to the critical date depict accurately the claimed invention and are very similar to the actual patent drawings used in the Pfaff patent. Defendant's Exhibit BF depicts the spreader used in the Pfaff patent. Defendant's Exhibit BG depicts the body of the housing shown in Fig. 2 of the Pfaff patent. Defendant's Exhibit BH depicts the base member 15 utilized in the Pfaff patent. Defendant's Exhibit BD shows the contact in detail.

There was no reduction to practice of the invention prior to the critical date. Not a single component of the patented invention was actually reduced to physical form prior to the critical date. Nothing relating to the claimed invention existed prior to the critical date except drawings and the inventor's mental impressions. There had been no testing of any component of the patented invention prior to the critical date.

In a recent case the Federal Circuit restated the underlying policies that drive the § 102(b) analysis:

> Foremost among these is the policy of preventing inventors from exploiting the commercial value of their inventions while deferring the beginning of the statutory term . . . To this end, the inventor is strictly held to the requirement that he file his patent application within one year of any attempt to commercialize the invention. The demands of this policy must be

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[106] Defendant Exhibit BO, at page 71.

> weighed with the sometimes inconsistent goals of encouraging prompt and widespread disclosure of inventions to the public, discouraging the removal of inventions from the public domain when the public has come to rely on their ready availability, and giving inventors a reasonable period to discern the potential value of an invention.[107]

Regarding the issue of whether or not an actual reduction to practice of the invention is needed before the critical date, the Federal Circuit has stated that:

> In view of all of the above considerations, we conclude that reduction to practice of the claimed invention has not been and should not be made an absolute requirement of the on-sale bar.
>
> We hasten to add, however, that we do not intend to sanction attacks on patents on the ground that the inventor or another offered for sale, before the critical date, the mere concept of the invention. Nor should inventors be forced to rush into the Patent and Trademark Office prematurely. On the other hand, we reject UMC's position that as a matter of law no on-sale bar is possible unless the claimed invention has been reduced to practice in the interference sense.[108]

Pfaff contends that the invention was a "mere" conception at the time of the critical date. Wells contends that the conception was in the form of completed detailed

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[107] *Ferag AG, v. Quipp Incorporated*, 33 USPQ2d 1512 (Fed.Cir. 1995).

[108] *UMC Electronics Co. v. United States*, 816 F.2d 647, 656, 2 USPQ2d 1465 (Fed. Cir. 1987).

engineering drawings from which Weiss-Aug produced the socket device.

Subsequent to the UMC case the Court of Appeals for the Federal Circuit provided more guidance on this issue in *A.B. Chance Co. v. RTE Corp.*, 854 F.2d 1307, 7 USPQ2d 1881 (Fed. Cir. 1988). In that case the patent holder argued that its offer for sale was "of a concept only because critical components of the claimed invention had not been developed, no embodiment had been built, and the inventors did not know and could not have known whether their invention would work."[109] The Federal Circuit found that inferences could be drawn in the patent holder's favor and that they created a genuine issue of fact which rendered the District Court's grant of Summary Judgment improper.

Wells contends that the facts in this case are different from the Chance case because Mr. Pfaff believed that his device would work. His practice was to bypass producing prototypes and go strictly from drawings to hard tooling without building any prototypes or testing them. Pfaff contends that with no prototype and not even a single component of the invention built, there was no way of testing the device prior to the critical date. Only after the device has been built, could any testing be done to determine whether or not the performance would meet the standards set forth in the Texas Instrument order.

There has been no evidence in this case that any part of the invention, whether it was an ordinary routine part

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[109] *A.B. Chance Co. v. RTE Corporation*, 854 F.2d 1307, 1311, 7 USPQ2d 1881 (Fed. Cir. 1988).

or a critical never-before-made part was in existence at the time of the critical date. No matter how confident the inventor was that his conception would work, even confident enough to order the expensive tooling, the conception embodied in the detailed drawings, although a complete conception, did not advance further than a "mere" conception. There has been no evidence presented of any prior product on which the patented invention was merely an improvement. Rather the inventive design appears to be totally new with respect to each component part. Neither the assembly of the parts nor any of the individual parts existed at the time of the critical date according to the facts presented in this case.

Accordingly, the court finds that there is insufficient evidence of an offer of sale prior to the critical date that would render the Pfaff patent invalid under 35 U.S.C. § 102(b).

10. Novelty

The statutory requirement that a patented invention be "new" is set forth in 35 U.S.C. § 102(a) and (b), which provides that:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more

> than one year prior to the date of the application for patent in the United States, . . .

Anticipation under § 102(a) or (b) requires that the identical invention that is claimed was previously known to others and thus is not new.[110]

10a. TO-5 Contactor

Wells has sold a socket device known as the TO-5 Contactor since the early 1970s. The TO-5 Contactor device includes a removable carrier portion for accepting a round transistor component with long leads arranged in a circle. The carrier portion is sectioned so as to electrically insulate and support the transistor leads.[111] The TO-5 Contactor further includes a top which is shiftable to engage a plurality of contacts to spread the contacts so that upon the top being appropriately positioned, the component leads are biased against the contacts. The TO-5 Contactor further includes a top shiftable to engage a plurality of contacts to spread the contacts so that upon the top being appropriately positioned, the component leads are biased against the contacts.

While the operation of the TO-5 contact is not clear from Defendant's Exhibit AW Drawing, the operation is clearly observable by inspecting the actual device, Defendant's Exhibit BR. The top of the device is shiftable

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[110] *Lindermann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984).

[111] Defendant Exhibit AW Drawing, and Exhibit BR Physical Exhibit.

vertically between two positions. When moved upward, the top spreads the contact pins which are arranged in a circle like the leads of the transistor. When moved downward, the circle of pins close toward the center. The removable carrier portion for accepting the leaded transistor component is placed into the upper portion of the top when the top is in the raised position. Upon lowering both the carrier and the top, the pins are released so that they engage the leads of the transistor. In order to remove the transistor, the top is raised so that the contact pins are separated from the transistor leads, allowing the carrier to be removed from the upper portion of the top.

From a visual inspection of the actual TO-5 Contactor, it is clear that the top and the carrier move reciprocally together and not independently.

Claim 1, paragraph (c) calls for "unitary means operable independently of said leadless chip carrier . . . ". Since the operation of the TO-5 Contactor does not permit independent reciprocal movement of the top and carrier, this limitation is not met by the TO-5 Contactor. Claim 1, paragraph 7 continues to define the function of the independent operation of the leadless chip carrier and unitary means "for uniformly spreading the ends of said pins extending from said first major face to permit the insertion of a leadless chip carrier therebetween." The independent operation allows the contacts to be spread by the unitary means and then at a later time, the leadless chip carrier can be inserted between the spread pins. As detailed in Section 10c. hereinbelow, "independently" was added by way of amendment to overcome prior art.

The court finds that claim 1 and dependent asserted claim 6 are not invalid under § 102 in view of the TO-5 Contactor.

Claim 7, paragraph (b) of the Pfaff patent calls for "the free ends of said contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimensions . . . ". Paragraph (c) of claim 7 calls for "unitary spreader means comprising a substantially rectangular body . . . ". The rectangular shape accommodates the common industry leadless chip carrier which may be inserted into the rectangular cavity.

The contact pins in the TO-5 Contactor are arranged in a circle to receive the leads of the circular transistor.

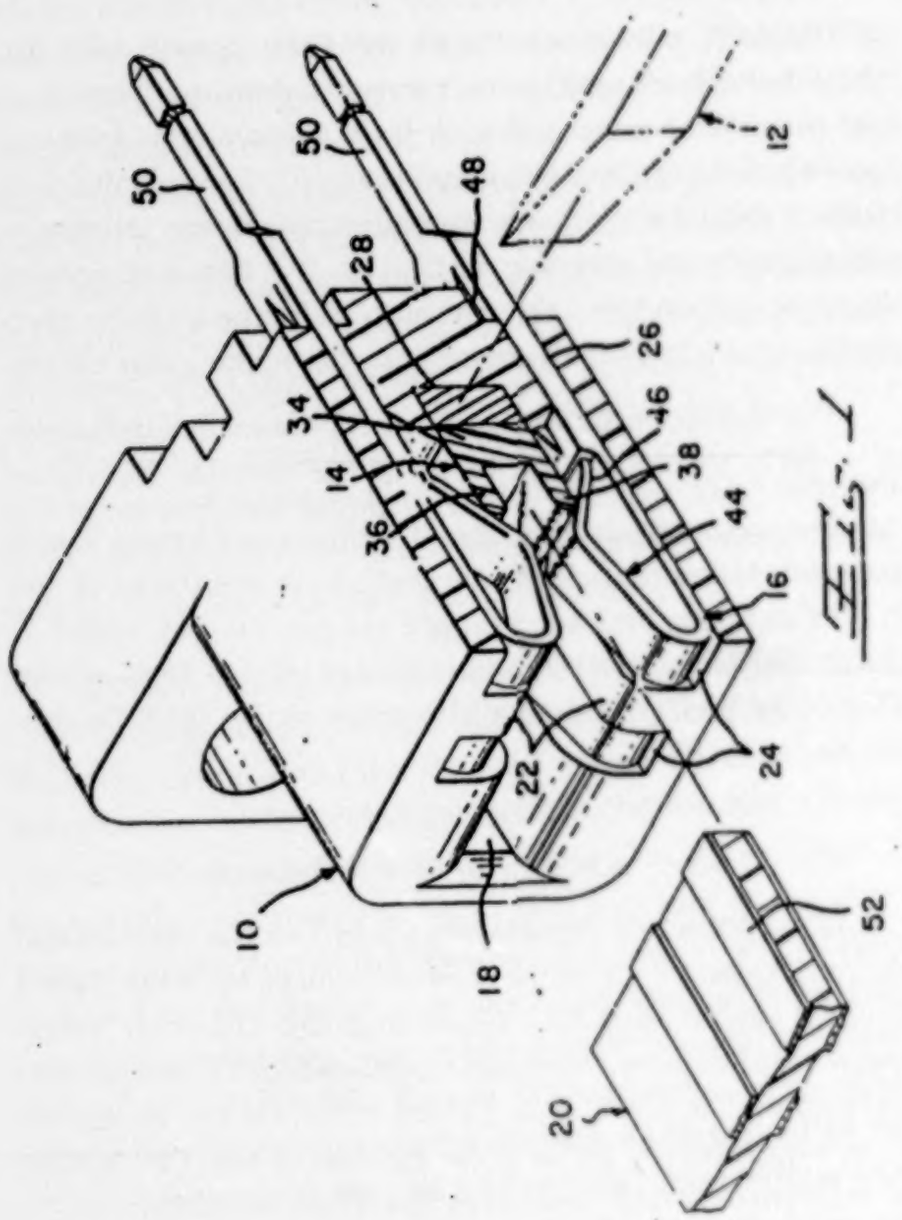
The court finds that the limitations of claim 7 and asserted dependent claims 10 and 11 are not found in the TO-5 Contactor and accordingly are not invalid under 35 U.S.C. § 102. Asserted independent claim 19 was not alleged by Wells to be invalid in view of the TO-5 Contactor under § 102.

10b. AMP Prior Art References

Wells contends that claims 1 and 7 of the Pfaff patent are anticipated by a number of references by AMP Incorporated under 35 U.S.C. 102(a) and (b). The AMP references are shown in Defendant's Exhibits S, H, M and AN. Defendant Exhibit S, U.S. Patent 3,899,234 by Yeager et. al. is suggested by Wells to be the best of the AMP group of references which describes the Pfaff invention.

Shown below is Figure 1 of the AMP/Yeager '234 patent.

AMP/Yeager Patent Produced by Wells



The Yeager device is a low insertion force connector for mounting printed circuit boards. In operation the cam member 12 is longitudinally inserted into groove 28 through the housing 10. With the cam 12 fully inserted, the sidewalls 36 and 38 of the contact driving member 14 engage the free ends 46 of the contacts and bias the contacts 16 to a position where they lie substantially fully within the recess 24 to clear aperture 18 and allow the insertion of the circuit board 20 without any wiping of the pads 52 on the circuit board by contacts 16 or force being applied to the board. When the circuit board 20 is fully inserted in aperture 18, the cam member 12 is withdrawn allowing the driving member 14 to return to the position prior to insertion of the cam member 12 under the resilient force of the contacts, as well as possible continued insertion force of the circuit board.

Claim 1, paragraph (c) calls for a "unitary means operable independently of said leadless chip carrier", and claim 7, paragraph (c) calls for a "unitary spreader means comprising a substantially rectangular body. . . . "

The word "unitary" was inserted into paragraph (c) of both claims 1 and 7 by way of amendment in order to overcome the Anhalt patent cited by the Examiner. Figure 2 of the Anhalt patent is illustrated hereinabove in Section 4.

After inserting the word "unitary", applicant argued in the Remarks in the Amendment responding to the second Office Action,[112] as follows:

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[112] See page 8 of Remarks in Defendant Exhibit D.

> Furthermore, applicant's device specifically defines a *unitary* spreader. In other words, instead of a pair of spreaders activated by a pair of mating cams activated by a actuating lever (five different complicated parts interconnected by a pin), applicant's device uses a *single unitary* part radically simplifying the design and cost of manufacture. The unitary design also greatly improves reliability since it has only one moving part as contrasted to six interrelated moving parts in the reference.

The court finds that the camming action in the Anhalt reference cited by the Examiner is very similar to the camming action in the Yeager and other AMP references produced by Wells. With respect to the camming action, the AMP references are no better than the Anhalt reference cited by the Examiner. The court finds that independent claims 1 and 7 and dependent claims 6, 10, and 11 of the Pfaff patent are not anticipated by the AMP references.

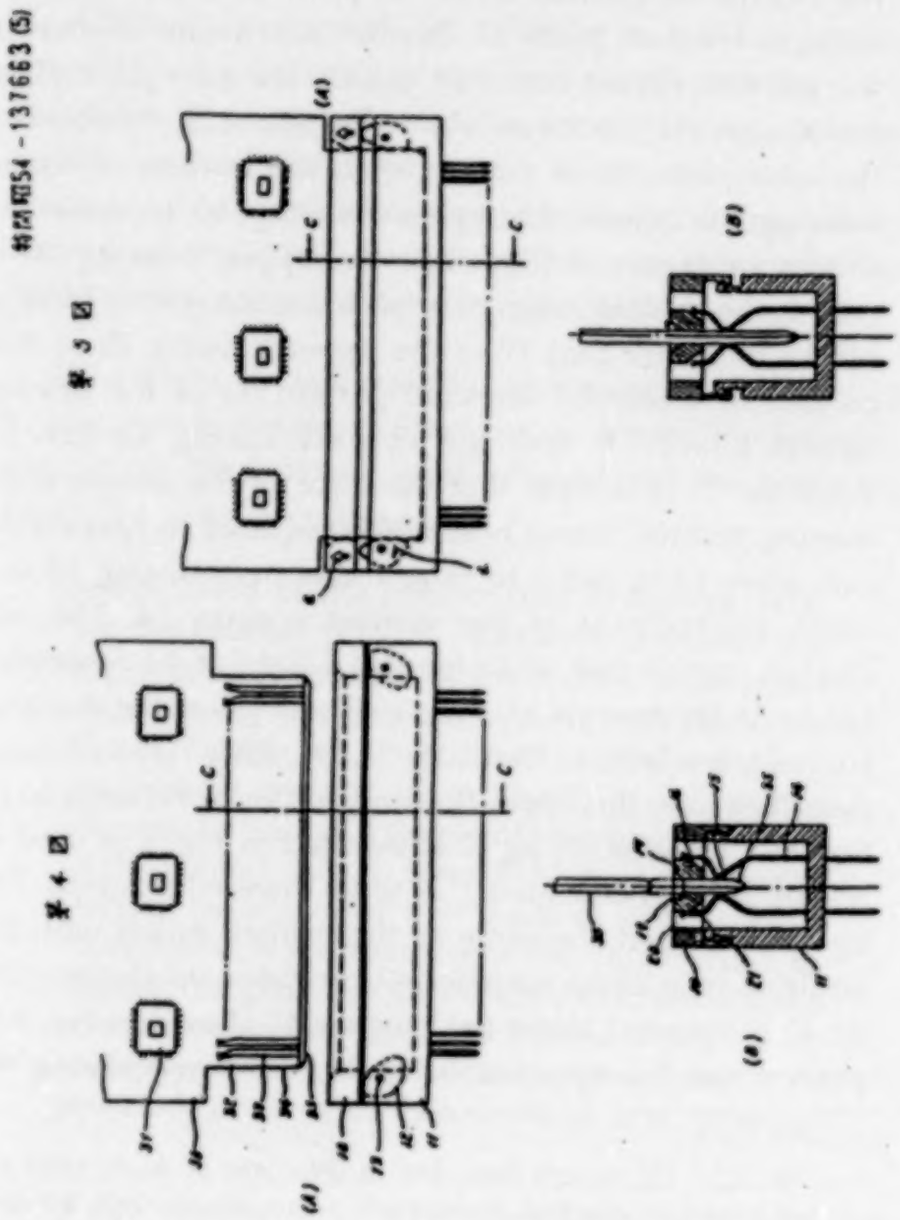
10c. Japanese Laid-Open Patent Application

Wells contends that claims 1, 6 and 7 of the Pfaff patent are anticipated by the Japanese patent application which was laid-open by the Japanese Patent Office.[113] Figures 4 (A) and (B) and Figures 5 (A) and (B) are illustrated below.

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[113] Defendant Exhibit ALA.

Japanese Laid-Open Patent Application Produced by Wells



In operation when the printed circuit board 30 is inserted into the upper housing 10 and lower housing 11, the chamfered portion 35 of the printed circuit board 30 engages the cam plate 12. Further downward motion of the printed circuit board 30 causes the cam plate 12 to rotate counter clockwise about the shaft 13. Rotation of the cam plate 12 in contact with the bottom of upper housing 10 causes the upper housing 10 to raise. As shown in Figure 5 (B) when the upper housing 10 is raised, the leading edge 16 of each contact spring 14 slips off the shoulder part 17 of the upper housing 10 so that contact between the terminal pattern 33 of the printed circuit board 30 and the contact spring 14 can be achieved.[114] It is clear that the force of the downwardly moving printed circuit board 30 is required to operate the cam plate 12 in order to raise the upper housing 10 and cause engagement of the contact springs 14. The full English translation of Defendant's Exhibit ALA submitted by Defendant on May 31, 1995 and given the designation Defendant's Exhibit "ALA Full Translation" describes how the upper housing 10 can be restored to its lowered position. A jig 42 illustrated in Fig. 6 is used to restore the upper housing 10 to its lowered position. The jig 42 is shaped the same as the printed board with the addition of a press member 43 provided on the tip. The jig 42 is inserted along the grooves 41 shown in Fig. 6 to push down the upper housing 10, thereby restoring the

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[114] "Q. I'll accept that. But in this case of ALA, after the circuit board is inserted, it contacts a cam which then actuates the lid to release the pins; is that correct?

A. That's correct.", Trial Transcript in this case, page 556, lines 1-5.

upper housing 10 to the state for receiving another printed board to start the push-in/pull-out cycle again.

Claim 1, paragraph (c) calls for a "unitary means operable independently of said leadless chip carrier . . . ", and claim 7, paragraph (c) calls for a "unitary spreader means comprising a substantially rectangular body. . . . " The word "unitary" was inserted during the prosecution history of the Pfaff patent in order to overcome the Anhalt reference cited by the Examiner.[115]

The word "independently" was inserted into claim 1 in response to the first Office Action during the prosecution of the Pfaff patent. In the Remarks[116] the applicant made the following argument:

> Substitution of the contact pins of Eledge, et al for the contact pins of Pauza, et al would not solve the deficiencies of the Pauza, et al reference pointed out hereinabove. Neither Pauza, et al nor Eledge, et al show or remotely suggest any means *operable independently of the leadless chip carrier* and coacting with the *inner* surfaces of the contact pins to spread the pin and thereby permit insertion of the leadless chip carrier therebetween without using the chip carrier to spread the pins . . . Since each of these claims specifically require that the spreader pins coact with the *inner* surface of the contact pins *independently* of the chip carrier itself, and since no

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[115] See Section 10b. hereinabove for a quote from the Remarks of the applicant stating the purpose of the addition of the word "unitary".

[116] See page 5 of the Remarks in Defendant Exhibit D.

such structure is shown or even remotely suggested by either of the references, it is respectfully submitted that the rejection is inapposite and should be withdrawn.

Elsewhere in these same Remarks the applicant distinguishes the Pfaff invention from the Pauza reference cited by the Examiner[117] by pointing out that Pauza must apply pressure to the carrier to spread the contact pin arms.

As recited in Section 10 hereinabove, the applicant explained to the Examiner that the amendment to claims 1 and 7 adding the word "unitary" were made in order to overcome the Anhalt patent. "The unitary design also greatly improves reliability since it has only one moving part as contrasted to six interrelated moving parts in the reference."

The Japanese application teaches the use of multiple component parts in order to move the contact springs 14 into contact with the printed board, including the cam plates 12, shafts 13 and the upper housing 10. In operation the Japanese application does not use the cam plates 12 and shafts 13 to restore the springs 14 to the open position. Wells makes the argument that claim 1, paragraph (c) is a "means for" claim limitation for spreading the ends of the pins.[118] This argument invites the court to

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[117] See Section 4 hereinabove for an illustration of Figure 3 of the Pauza patent.

[118] Defendant's Reply to Plaintiff's Response to Defendant's Motion to Submit Into Evidence and To Make Part Of The Record The Full English Translation of Previously Admitted Foreign Reference, filed June 21, 1995, page 4.

ignore the teachings in the Japanese reference of the use of multiple parts, and to focus instead on just the portion of the Japanese reference that teaches how the spreading of the pins is accomplished. The court finds that this is appropriate. The upper housing 10 spreads the contact springs 14 without the use of the cam plate 12 and shaft 13. The Japanese patent application teaches how to spread the contact pins in the same manner as taught and claimed in the Pfaff patent.

The court finds that the unitary means operable independently of said leadless chip carrier recited in paragraph (c) of claim 1 is disclosed by the operation of the upper housing 10 in the Japanese patent application which operates independently of the printed board 3 for uniformly spreading the ends 2' of the contact springs 2. The court notes that paragraph (c) of claim 1, second line recites "leadless chip carrier" while the Japanese application discloses a printed board 3. However, in the context of the recitation of the unitary means in paragraph (c) of claim 1, no distinction can be observed by the court.

The court also finds that all other elements of claim 1 and claim 6 of the Pfaff patent are disclosed in the Japanese application.

Regarding claim 7, the court has already in Section 10(a) in connection with the TO-5 contactor observed that claim 7, paragraph (b) calls for "the free ends of said contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimension . . . ". The rectangular shape is also called for in paragraph (c) of claim 7 "unitary spreader means comprising a substantially rectangular body . . . ".

The rectangular shape accommodates the commor adus-try leadless chip carrier which may be inserted into the rectangular cavity.

Just as the TO-5 Contactor failed to disclose the rectangular shape, the Japanese application also fails to show the rectangular shape for accommodating the leadless chip carrier, and instead discloses the pins 2 arranged as an edge board connector for accommodating the printed board 3. The court finds that independent claim 7 and dependent claims 10 and 11 are not anticipated by the Japanese application.

In summary, the court finds that claims 1 and 6 are anticipated by the Japanese application, and claims 7, 10 and 11 are not anticipated by the Japanese application.

10d. Is the Japanese Laid-Open Patent Application A "Printed Publication"

Pfaff contends that the Japanese patent application which was laid open by the Japanese Patent Office is not a "printed publication" within the meaning of 35 U.S.C. 102(b). Pfaff directs the court's attention to the Court of Customs and Patent Appeals case *In re Wyer*.[119] In that case an Australian patent application was laid open to public inspection by the Australian Patent Office and a printed abstract thereof was published. It was the practice of the Australian Patent Office when the abstract of an Australian application was published to produce two

[119] *In re Wyer*, 210 USPQ 790 (Court of Customs and Patent Appeals 1981).

microfilm copies of eacn specification. One of the microfilm copies was retained in the Australian Patent Office as a security reel, while a second copy was provided in altered form to five suboffices of the Australian Patent Office where the specification of the Australian patent application can be viewed on a display screen by members of the public.

The Court of Customs and Patent Appeals referred to a prior case[120] when considering the question of whether a reference is a "printed publication" and a bar to patentability as follows:

> . . . upon a satisfactory showing that such document as been [sic] disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art, exercising reasonable diligence, can locate it and recognize and comprehend therefrom the essentials of the claimed invention without need for further research or experimentation.

The Court of Customs and Patent Appeals found that the laid-open Australian patent application was a "printed publication" and accordingly sustained the USPTO Board of Appeals decision sustaining the Examiner's rejection. However, the Court of Customs and Patent and Appeals was not ready to approve the sweeping statement made in the Board of Appeals decision, that

> . . . the time has come to hold that a microfilm of a foreign patent application maintained in the

[120] *I.C.E. Corp. v. Armco Steel Corp.*, 250 F. Supp. 738, 742, 743, 148 USPQ 537, 540 (SD NY 1966).

> foreign patent office, accessible to the pertinent part of the public and available for duplication is a "printed publication" . . .

The Court of Appeals for the Federal Circuit in the *In re Wyer* case stated that

> We are approving its decision on the totality of the facts of this case, several of which are missing from that statement. Decision in this field of statutory construction and application must proceed on a case-by-case basis.

Pfaff objects to the use of the Japanese laid-open application as a reference since there has been no evidence introduced during the trial of this case that the Japanese laid-open application has been disseminated or otherwise made available as required in the *In re Wyer* case quoted above.

At the request of the court,[121] Wells has provided information describing the process followed by the Japanese Patent Office in laying open patent applications for inspection by members of the public.

Wells provided a single page description of the Japanese Patent Office procedure entitled, OPPOSITION PRACTICE by Shigeshi Tanaka.[122] According to Wells, the Tanaka page is from a synopsis of Japanese patent practice and explains what Laid-Open means. It states that "all patent applications are disclosed to the public after eighteen months from the filing date or, [the date of] the

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[121] Transcript of Oral Argument on issues of validity, December 8, 1994, pages 995-999, 1078-1084, and 1161 and 1162.

[122] Transcript of December 8, 1994 Oral Hearing, page 1078.

earliest priority date of the application . . . After the application is laid-open, any party may provide information to the Patent Office concerning the reasons to reject the patent application based on prior art or inadequate disclosure. . . . "

Wells has also provided to the court a copy of the cover and index pages 1-6 of the actual publication document issued by the Japanese Patent Office in which the Japanese laid-open application is listed.[123] The cover page indicates that the index was issued on October 25, 1979 and that the index includes patent application laid-open Nos. 54-137601 through 54-137700. The application laid-open number for the Japanese patent application produced in this case is 137,663. This application appears as index number 53 on page 4 of the index. The international class for the Japanese laid-open patent application in this case is set forth in the index. Other information about this application is set forth in the index, but appears in the Japanese language and has not been translated.

Wells provided further communication to the court[124] in which it contended that the above-described index is, in fact, the cover page and first six pages of the Japanese Patent Office Gazette in which the Japanese laid open application Exhibit No. ALA was published. According

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[123] Letter from James D. Hall dated February 6, 1995 enclosing a seven-page document in the Japanese language and a translation of the cover page.

[124] COMMENTS OF DEFENDANT ON DRAFT REPORT REGARDING FINDINGS OF FACT AND CONCLUSIONS OF LAW RECOMMENDED BY THE SPECIAL MASTER, Filed April 3, 1995, bottom of page 15 and top of page 16.

to Wells the page numbers printed at the bottom of Exhibit ALA, 297 through 301 are consecutive numbers in the same Gazette that contain the index pages 1-6. This would tend to indicate that all of the Japanese patent applications listed in the index were published in printed form in the Gazette on October 25, 1979, the date the Gazette was issued.

Wells also provided along with its April 3, 1995 comments, a Manual which describes the Japanese Patent Office procedure for publishing patent applications 18 months after the filing date, "the method of divulgation of a patent application consists in that the full text of specification, claims and drawings (with amendment, if any) are printed in the Patent Gazette."[125]

The court has considered the documents supplied by Wells in response to the court's requests, and finds that there has been a "printed publication" of the Japanese laid-open patent application.

11. Obviousness

35 U.S.C. § 103 provides, that

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in Section 102 of this title, if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

[125] MANUAL For The Handling Of Applications For Patents, Designs and Trademarks Throughout The World, Octrooibureau Los En Stigtert – Amsterdam, Supplement No. 66, September 1992, page 5 of the chapter on JAPAN, paragraph 2, Attachment to COMMENTS OF DEFENDANT ON DRAFT REPORT REGARDING FINDINGS OF FACT AND CONCLUSIONS OF LAW RECOMMENDED BY THE SPECIAL MASTER, filed April 3, 1995.

Obviousness is reviewed as a legal conclusion based upon underlying facts of four general categories.

(1) The scope and content of the prior art;

(2) The differences between the prior art and the claims at issue;

(3) The level of ordinary skill in the pertinent art; and

(4) Any secondary considerations such as commercial success, long-felt but unsolved needs, and failure of others.[126]

When determining the patentability of a claimed invention which combines two known elements, the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.[127]

One of the differences between the prior art TO-5 Contactor and claim 7 discussed in Section 10a. is the limitation in claim 7, paragraph (c) calling for a "unitary spreader means comprising a substantially rectangular

[126] *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S.Ct. 684, 693, 15 L.Ed.2d 545, 148 USPQ 459, 467 (1966).

[127] *Lindermann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984).

body" and the limitation in claim 7 (b) calling for "contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimensions . . . ". The TO-5 Contactor discussed above in Section 10a. is round and accordingly does not meet this limitation. Wells contends that "Although the TO-5 is round, the Defendant submits that the particular configuration of the chip carrier is not relevant. Carriers could be circular as well as rectangular depending upon the particular environment in which the particular carrier is to be utilized or received."[128] Wells alleges that a TO-5 device was made in which the cavity in the top of the Contactor was rectangular in shape to accommodate a similar shaped electrical device, but provides no supporting evidence of this device. No other combination of references is suggested.

The court finds that Wells has not shown by clear and convincing evidence that claim 7 is obvious in view of the TO-5 Contactor. Claim 19 which has similar limitations, including the rectangular configuration, and Claims 10 and 11 which are dependent upon claim 7 are also not invalid under Section 103 based on the TO-5 Contactor.

Claim 1 of the Pfaff patent in sub-paragraph (c) calls for "unitary means operable independently of said leadless chip carrier . . . ". In Section 10a. above, the court found that the TO-5 Contactor did not contain a spreader cap which operated independently from the carrier on which the leaded transistor is mounted. Wells notes that

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[128] Defendant's Trial Brief filed November 23, 1993 at page 26.

the words "operable independently of said leadless chip carrier" were added to claim 1 in an amendment filed during the prosecution of the Pfaff patent. Wells maintains that in this amendment Pfaff's attorney explains that the meaning of the language "operable independently of the leadless chip carrier" is in reference to the spreader means first or initially contacting and engaging the pins instead of the chip carrier as was the case in the Pauza reference being distinguished. With this understanding of the term "operable independently", it is readily seen according to Wells that the top in the Wells TO-5 device does make initial contact with the pins of the device independently of the carried component. According to Wells, claims 1 and 6 are at the very least rendered obvious under 35 U.S.C. § 103 by the TO-5 device.[129]

The court cannot agree that "operable independently" means that the top or spreader should make initial contact with the pins independent of the member carrying the component. The court's construction of "operable independently" does not include the possibility of the top or spreader moving in piggy-back fashion with the member carrying the transistor component as in the Wells TO-5 Contactor. There is no suggestion in the operation of the TO-5 Contactor that the top or spreader can be moved to spread the pins and then in an independent manner the transistor component mounted on the carrier can be dropped into place at a later time. Since there is no suggestion of this independent operation, claim 1 is not rendered obvious under § 103 by the TO-5 Contactor.

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[129] Defendant Trial Brief filed November 23, 1993 at pages 27 and 28.

Dependent claim 6 incorporates all the limitations of claim 1 and accordingly cannot be rendered obvious for the same reasons.

With regard to the Yeager '234 patent,[130] and the language in claim 7 calling for a rectangular configuration, Wells asserts that "such rectangular orientations to accommodate multiple sided electronic components are not new in the art as observed in such references as Defendant's Exhibits E, L, O, P and ABO."[131]

Wells does not point out any teaching in these Exhibits that would suggest combining any of them with the Yeager '234 patent or with any other references considered by the court, and the court can find nothing in these exhibits which would suggest such combination. Accordingly, claim 7, dependent claims 10 and 11 are found not to be invalid under § 103 in view of the Yeager reference and Defendant's Exhibits E, L, O, P and ABO.

Wells also contends that "anyone versed in the state-of-the-art mechanical motion and design of contacts could easily infer the Pfaff patent from the patent shown in Defendant's Exhibit S as well as the two other exhibits."[132] The court understands this to mean that Wells believes the Pfaff patent is obvious in view of the Defendant's Exhibit S Yeager '234 patent. The court found in Section 10b. above that the Yeager patent lacked the

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[130] Defendant Exhibit S.

[131] Defendant's Trial Brief filed November 23, 1993 at page 30.

[132] Defendant's Trial Brief filed November 23, 1993 at page 32.

unitary spreader means called for in claims 1 and 7. As shown in Figure 1 of the Yeager '234 patent appearing in Section 10b. above, the court considers the cam member 12 to be part of the member 14 which spreads the pins 44. Wells contends that the Pfaff invention requires a pressure actuator which forces the Pfaff unitary spreader downward. According to Wells, the cam member 12 is no more a part of the spreader than the pressure actuator is a part of the spreader means of Pfaff.[133] The court cannot agree with Wells' interpretation of the cam member 12 and its operation in the Yeager '234 patent. There is a substantial difference between the invention as defined in claims 1 and 7 and the illustrated operation of cam member 12 in the Yeager '234 patent. There is very little structural similarity between the contact driving member 14 of Yeager and the spreader cap 40 of the Pfaff invention. Neither the placement of these components within the overall device or their operation is similar. The court cannot find nor has Wells suggested any teaching in the Yeager '234 patent of the unitary spreader means disclosed and claimed in the Pfaff patent. Accordingly, independent claims 1 and 7 and dependent claims 6, 10 and 11 are found not to be obvious in view of the Yeager '234 patent, or any of the other similar AMP references.[134]

Wells contends that claims 11 and 19 containing the "barb" limitation are obvious under § 103 in view of a combination of the AMP references, particularly the

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[133] Defendant's Trial Brief filed November 23, 1993 at page 32.

[134] Other AMP references include Defendant Exhibits H, M and AN.

Yeager '234 patent and the barb disclosures in Defendant's Exhibits Z and ABY,[135] and a further combination of the TO-5 Contactor with the Lazar '382 patent.[136] Both the AMP references and the TO-5 Contactor lack a teaching of barbs on the Contactor pins. They also lack the teaching of other elements of the Pfaff invention defined in claims 11 and 19. Specifically, claim 19 calls for the "rectangular" configuration and claim 11 calls for both the rectangular configuration and the unitary spreader means. No combination of prior art suggested by Wells teaches all of the limitations in claims 11 and 19. The court finds that Wells has not provided clear and convincing evidence that claims 11 and 19 are obvious under § 103.

In Section 10c the court found that claims 1 and 6 of the Pfaff patent are anticipated by the Japanese application. On the other hand, dependent claim 7 is not anticipated by the Japanese application because of the limitations in claim 7, paragraph (c) calling for a "unitary spreader means comprising a substantially rectangular body" and the limitation in claim 7(b) calling for "contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimensions . . . ". These same limitations were discussed with reference to the TO-5 Contactor earlier in this Section 11. The court found that the TO-5 Contactor did not render

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[135] Defendant's Trial Brief filed November 23, 1993 at page 33.

[136] Transcript of oral argument December 8, 1994 at page 1077, and transcript of the trial on July 7, 1994, pages 374 and 375.

claim 7 obvious. This court likewise finds that the teachings in the Japanese application fail to provide more than the TO-5 Contactor, and for the reasons given earlier in connection with the TO-5 Contactor, the court finds that claim 7 is not obvious in view of the Japanese application alone, or in combination with any of the other prior art asserted by Wells. Claims 10 and 11 are dependent upon claim 7, and claim 19 recites the same language quoted from claim 7 in this Section 11 and accordingly are not invalid under § 103.

In reaching the above findings on obviousness, the court has been mindful of other factors considered under the *Gramm v. John Deere* case.[137] The court finds that the level of skill in the art of sockets for leadless chip carriers encompasses a degree of knowledge and experience typified by mechanical design engineers working in the field of electronic device packaging. Commercial success relating to the merits of the invention is evidenced by dramatic increases in annual sales of the patented device following its introduction by Pfaff in 1981. Sales of the patented device were as follows:

YEAR	SALES
1981	$ 350,000.00
1982	937,000.00
1983	2,800,000.00
1984	3,430,000.00
1985	4,088,000.00
1986	5,900,000.00

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[137] *Gramm v. John Deere Co.*, 383 U.S. 1, 86 S.Ct. 684, 15 L. Ed. 2d 545, 148 USPQ 459 (1966).

12. Indefiniteness Under 35 U.S.C. § 112

35 U.S.C. § 112 provides in part that:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.
>
> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the Applicant regards as his invention.

Wells contends that claim 1 of the Pfaff patent is invalid under § 112 for failing to particularly point out the subject matter which the applicant regards as his invention. In claim 1, column 7, lines 9-11 there contains the language:

> . . . inner edges of said pins converging slightly inwardly with distance from said first major face . . .

Also, in claim 1, column 7, lines 14-16, the unitary means or spreader is described as performing the function of:

> . . . coacting with *said* (emphasis added) inner edges of said pins for uniformly spreading the ends of said pins . . .

Wells contends that the language quoted above from claim 1 is not disclosed in the drawings nor is it described in the specification. Wells interprets the claim to call for

the unitary spreader means to engage the inwardly converging edges of the pins and then points out that the drawings and specification disclose that the unitary spreader means contacts the outwardly inclined edges of the pins.

The court cannot agree with Wells' interpretation of claim 1 which would make it inconsistent with the drawings. Claim 1 calls for the unitary means to coact with the *inner edges of the pins*, not with the inner edges of the pins *which converge slightly inwardly*. Claim 1 neither calls for the unitary means to coact with the inner edges which converge slightly inwardly nor to coact with the inner edges which are outwardly inclined. Claim 1 simply calls for the unitary means to coact with the inner edges, and by inspecting the drawings that is what is disclosed. Further, the court finds that there is no need for claim 1 to specify which portion of the inner edges of the pins makes contact with the unitary means.

The second contention that Wells makes with respect to § 112 relates to claims 7 and 19. Wells contends that there is language in sub-paragraph (b) of claims 7 and 19 stating that:

> . . . the ends of said contact means defining said cavity having edges which incline inwardly toward said cavity in said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel to said first major face . . .

Wells states that the patentee appears to be describing the edges of the contact means as being inclined in the first and second planes, each paralleling a first face of

the supporting housing. Wells complains that the description and specification of the Pfaff patent does not contain any explanation or definition as to what the first and second planes refer to, nor is it understood how a group of inclined edges lie in any plane paralleling any surface of a support housing. What is expressed in the claims 7 and 19 with respect to the angles of incline of the contacts is not geometrically possible and renders the claims indefinite under 35 U.S.C. § 112, second paragraph.[138]

Section 2 above describes the Pfaff invention and concludes with an illustration of Figures 4 and 5 of the patent drawings. With reference to Figure 5 and with the aid of the specification of the Pfaff patent, the pins have two blades (20a and 20b). The blade 20b has on its right side two inclined edges facing the inside of the mounting means where the leadless chip carrier is inserted. There are four rows of pins all having their blades 20b arranged in a rectangle to define a rectangular-shaped cavity (better illustrated in Figure 1 of the Pfaff patent). The inner edge of the blade 20b is recited in claim 7, line 5 to incline inwardly toward said cavity and is labeled 51 in Figure 5. Inclined inner edge 51 extends from the point where leader line 51 engages the inner edge of blade 20b and extends down to the upper face of housing 16. The plane as set forth in claim 7, line 6 can be considered to cut through the inner edge 51 of each of the blades 20b arranged in the rectangular configuration.

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[138] Defendants Trial Brief filed November 23, 1993 at pages 34 & 35.

With this understanding of the configuration of the pin in Figure 5, it can be seen that claim 7, line 5 calls for the edges 51 to be inclined inwardly *in* (emphasis added) a plane substantially parallel with the upper face of housing 16. Referring back to Figure 5, the inner edge of blade 20b also has another portion labeled "50" which inclines outwardly from the cavity. With this understanding of the Pfaff invention has illustrated in Figure 5, the claim 7, line 7 call for the inner edge of blade 20b to have an outwardly inclined portion 51 which intersects a second plane substantially parallel with the upper surface of body 16. Each outwardly extending inner edge 50 of the array of rectangular pins intersects a plane parallel to the upper face of housing 16. Accordingly, it can be said that each outwardly inclined edge 50 is *in* (emphasis added) a second plane.

It is well established that claims are not to be read in a vacuum, and limitations therein are to be interpreted in light of the specification and giving them their broadest, reasonable interpretation.[139] The court finds that Wells has not met its burden of showing by clear and convincing evidence that the claims 1, 7 and 19 are indefinite under § 112.

13. Conclusion Regarding Validity

Based on the foregoing, the court concludes that:

(a) The invention in the Pfaff patent was not on sale prior to the critical date.

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[139] *In re Marosi*, 710 F.2d 799, 218 USPQ 289, 292 (Fed. Cir. 1983).

(b) Claims 1 and 6 in the Pfaff patent are anticipated by Japanese laid-open application under 35 U.S.C. § 102(b), while the remaining asserted claims 7, 10, 11 and 19 are not.

(c) The asserted claims in the Pfaff patent are not anticipated by the AMP references or the TO-5 Contactor.

(d) The Japanese laid-open application is a "printed publication".

(e) Claims 7, 10, 11 and 19 in the Pfaff patent are not obvious under 35 U.S.C. § 103 in view of the prior art discussed herein.

(f) The asserted claims are not indefinite under 35 U.S.C. § 112.

Respectfully submitted,

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Wayne K. PFAFF,
Plaintiff-Appellant,

v.

WELLS ELECTRONICS, INC.,
Defendant-Appellee.

No. 92-1431.

United States Court of Appeals,
Federal Circuit.

Sept. 10, 1993.

Barry L. Grossman, Banner, Birch, McKie & Beckett, of Washington, DC, argued for plaintiff-appellant. With him on the brief was Joseph M. Skerpon.

James D. Hall, Oltsch, Knoblock & Hall, P.C. South Bend, IN, argued for defendant-appellee.

Before PLAGER, Circuit Judge, BENNETT, Senior Circuit Judge, and SCHALL, Circuit Judge.

PLAGER, Circuit Judge.

Plaintiff Wayne K. Pfaff appeals the judgment of the United States District Court for the Northern District of Texas (district court or Texas court), No. 3-91-CV-1542-H (June 2, 1992), in a patent infringement suit. The district court granted summary judgment of noninfringement to defendant Wells Electronics, Inc. (Wells). We reverse and remand for further proceedings because the district court erred by resolving a disputed material factual issue on summary judgment.

FACTUAL BACKGROUND

Pfaff is the inventor and owner of United States Patent No. 4,491,377 ('377 patent), which relates to a housing for mounting and testing leadless chip carriers.[1] Pfaff's housing contains three basic elements: (1) a base support, (2) conductive pins arranged vertically on the base to form a rectangular cavity the size of the leadless chip carrier, and (3) an open lid or spreader on top of the pins. For convenience, a chip enclosed in a leadless chip carrier is hereinafter referred to simply as a "chip."

To operate the device, one depresses the lid, which presses against the conductive pins, thus spreading them outward to increase the cavity's size. The chip can then be inserted through the opening in the lid into the cavity defined by the pins. When the lid is released, the conductive pins spring inward to make electrical contact with the chip. The pins not only provide electrical contact, but also hold the chip securely in place. To remove the chip, one inverts the housing and presses on the lid; this spreads the pins and allows the chip to fall out.

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[1] A leadless chip carrier is a protective enclosure for chips. An integrated circuit chip is packaged within a ceramic or plastic carrier which incorporates electrical leads for connecting the chip to other circuitry. More recently, the industry has replaced the conventional leads with terminal lands, or contact pads, around the periphery of the carrier. When a leadless chip carrier is mounted for testing or for connection with a circuit board, the terminal lands on the carrier must be aligned with corresponding contacts in the housing into which the carrier is placed.

Claim 1 of Pfaff's patent, which is representative of the claims at issue,[2] reads:

> 1. Mounting means for a leadless chip carrier comprising:
>
> (a) base support means having first and second oppositely disposed major faces;
>
> (b) a plurality of axially elongated conductive pins passing transversely through said base support means substantially perpendicular to said first and second major faces, *the opposed inner edges of the ends of said pins* extending from said first major face *arranged to define a cavity* substantially conforming to at least two oppositely disposed lateral peripheral dimensions of said leadless chip carrier in a plane parallel with said first major face and the inner edges of said pins converging slightly inwardly with distance from said first major face; and
>
> (c) unitary means operable independently of said leadless chip carrier reciprocally moveable axially with respect to said pins and *coacting with said opposed inner edges* of said pins for uniformly spreading the ends of said pins extending from said first major face to permit the insertion of a leadless chip carrier therebetween. [emphasis added]

In 1986 Pfaff sued Wells in the United States District Court for the Northern District of Indiana (Indiana court), alleging that two of Wells' devices infringed claims 1 and 6-10 of the '377 patent. Wells counterclaimed

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[2] Pfaff states that claim 1 "may be considered as representative of all the claims for the purposes of this appeal." Appellant's Br. at 16.

that Pfaff's patent was invalid. The Indiana court held that Pfaff's patent was not invalid and that Wells' devices did not infringe claim 1 of Pfaff's patent because their pins were not "axially elongated" and did not have opposed inwardly converging inner edges. Instead, the pins "are shortened and are rolled outwardly by a return bent portion." Furthermore,

> [t]he unitary spreader means of the Wells device does not coact with those inner edges of the conductive pins that define the cavity. The unitary spreader means of the Wells device coacts with an arm extended from the pins. Even if the court views the arms . . . as inner edges of the conductive pins, those "inner edges" formed by the arms are not the same "inner edges" that define the cavity.

Pfaff v. Wells Electronics, Inc., 9 USPQ2d 1366, 1369-70 1988 WL 156744 (N.D.Ind. 1988), *aff'd*, 884 F.2d 1399 12 USPQ2d 1158 (Fed.Cir.1989) (nonprecedential).

The Indiana court also held that prosecution history estoppel prevented Pfaff from claiming infringement under the doctrine of equivalents. The Patent and Trademark Office (PTO) Examiner had rejected original claim 1, as filed, on the grounds it was anticipated by (1) William Pauza et al., U.S. Patent No. 3,753,211, which discloses a direct force insertion device in which the lid presses against the outer edges of the pins to force them inwardly into contact with a chip, and by (2) Anhalt, U.S. Patent No. 4,159,861, which discloses a device in which pins rise from the base with an inward incline and then bend outward in a semi-circular fashion to end in a downwardly extending arm, and in which a camming device

presses upwardly against the semi-circular portion of the arms to retract the pins outwardly. To distinguish these references, Pfaff amended Claim 1 to recite "axially elongated" to describe the pins and the phrase "coacting with said opposed inner edges of said pins" in reference to the spreader.

In affirming that decision, this court said that "the claim requires the coaction of the spreader means with the pin ends' inner edges which define the cavity." *Pfaff v. Wells Electronics, Inc.*, 12 USPQ2d 1158, 1159, 884 F.2d 1399 (Fed.Cir.1989) (nonprecedential). We agreed with the Indiana court that Wells' devices were noninfringing because their pins were not axially elongated and did not incline in a plane substantially parallel to the first major face, and because their spreaders coacted with a portion of the pin ends that did not define the cavity. We also agreed with the Indiana court that prosecution history estoppel prevented Pfaff from construing Wells' pins and spreader as equivalents; "Pfaff amended his claims [to overcome prior art by] adding 'axially elongated' to limit his pins and 'inner edges' to limit the structure defining the cavity." *Id.* at 3.

On August 1, 1991 Pfaff commenced this suit in Texas, alleging that six of Wells' subsequently-developed devices infringed claims 1, 6-7, 10-11 and 19 of his patent. On April 15, 1992 Wells moved for summary judgment. On May 1, 1992 Pfaff filed a brief in opposition; on May 11, 1992 Wells replied. On June 2, 1992 the Texas court granted summary judgment to Wells. With regard to literal infringement, the court said:

> Defendant's six devices depart from at least one *essential* element of Plaintiff's Patent claims. Specifically, the unitary spreader means of Defendant's six devices do *not* coact with the inner edges of the conductive pins that define the cavity. . . . Defendant's unitary spreaders coact with portions of the pins which are *laterally removed* from the inner edges of the pins which define the cavity. In no instance do the unitary spreaders come in contact with the cavity.
>
> Defendant also argues that two other essential elements of the Plaintiff's claims are not satisfied by the accused device: the pins in the accused device are not axially elongated, and they do not inwardly incline [in] any plane substantially parallel to the first major face of the socket housing. The Court, however, need not address Defendant's additional arguments because as stated above, the fact that a single element essential to the Patent Claims 1 and 7 is not present in the accused device defeats Plaintiff's assertions of infringement.

Pfaff v. Wells Electronics, Inc., No. 3-91-CV-1542-H, slip op. at 6-7 (N.D.Tex. June 2, 1992) (emphasis in original).

The court also found no infringement under the doctrine of equivalents:

> It is beyond question, and the Indiana Court has so found, that one of the specific elements amended by Plaintiff to overcome the deficiencies of his application Claims 1 and 7 was that the spreader means operated on and coacted with the *inner* edges of the pin, as contrasted to the outer edges.

> Furthermore, the *inner* edges of the pins was defined as those edges "mating with" or "defining the cavity". Plaintiff now can not contend that Defendant's devices with the spreader means coacting with the outer edges of the pins which do not mate with or define the cavity are equivalents. The doctrine of prosecution [history] estoppel defeats Plaintiff's reliance on the doctrine of equivalents.

Id. at 9 (emphasis in original, citations omitted).

On June 12, 1992 Pfaff filed a motion for reconsideration and submitted deposition excerpts and an expert affidavit testifying that the Wells spreaders coact with "inner edges" of the conductive pins. On June 17, 1992, the district court denied reconsideration.

DISCUSSION

Summary judgment is proper only if there is no genuine issue of material fact and the prevailing party is entitled to judgment as a matter of law. Fed.R.Civ.P. 56(c). All evidence must be viewed in the light most favorable to the non-moving party, and all reasonable inferences should be drawn in favor of the non-moving party. *Telectronics Pacing Sys., Inc. v. Ventritex, Inc.*, 982 F.2d 1520, 1522, 25 USPQ2d 1196, 1197-98 (Fed.Cir.1992). In reviewing the trial court's decision, we are required to independently determine whether the standards for summary judgment have been met. *C.R. Bard, Inc. v. Advanced Cardiovascular Sys., Inc.*, 911 F.2d 670, 673, 15 USPQ2d 1540, 1543 (Fed.Cir.1990).

A. Collateral Estoppel/Issue Preclusion

In its ruling, the Texas court relied on the Indiana court's claim interpretation as "res judicata:"

> Despite the disparity in the devices and two of the Claims at issue, the Indiana Court's findings in relation to the prosecution history of the Patent, and the elements essential to certain Claims in the Patent are res judicata . . .

Id. at 2.

Wells contends that, by disputing the interpretation of the term "inner edges" and the prosecution history estoppel analysis, Pfaff is repeating arguments that were rejected previously in the Indiana case. According to Wells, Pfaff may not do this because the claim interpretation and prosecution history estoppel rulings in the Indiana case represent law of the case or res judicata. Wells alleges that the six devices at issue here are similar to the prior two devices at issue in the Indiana case, because they lack spreaders which contact inner edges defining the cavity, and thus do not infringe the '377 patent.

Pfaff argues that the prior Indiana litigation does not preclude an assertion of infringement here, because the six devices at issue now are significantly different from the two devices adjudged noninfringing in the Indiana case. The six devices contain a feature lacking in the prior two devices – a spreader coacting with inner edges that define the cavity. Thus, says Pfaff, the six devices infringe under the claim interpretation used by the Indiana court.

In describing the issue as "res judicata" or "law of the case," the district court and Wells have misused these

terms. Res judicata, or *claim* preclusion, deals with the effect of a prior judgment on the identical claim or cause of action between the same parties. Collateral estoppel, or *issue* preclusion, deals with the relitigation of issues previously decided, when such issues arise in a subsequent litigation on a claim not barred by res judicata. 1B James W. Moore et al., Moore's Federal Practice ¶ 0.401 (2d ed. 1992).

We have said previously that "judicial statements regarding the scope of patent claims are hypothetical insofar as they purport to resolve the question of whether prior art or products not before the court would, respectively, anticipate or infringe the patent claims." *A.B. Dick Co. v. Burroughs Corp.*, 713 F.2d 700, 704, 218 USPQ 965, 968 (Fed.Cir.1983). "A device not previously before the court, and shown to differ from those structures previously litigated, requires determination on its own facts." *Del Mar Avionics, Inc. v. Quinton Instrument Co.*, 836 F.2d 1320, 1324, 5 USPQ2d 1255, 1258 (Fed.Cir.1987). *Young Engineers, Inc. v. United States Int'l Trade Comm'n*, 721 F.2d 1305, 1316, 219 USPQ 1142, 1152 (Fed.Cir.1983) ("With respect to patent litigation, we are unpersuaded that an 'infringement claim,' for purposes of claim preclusion, embraces more than the specific devices before the court in the first suit."). However, "where a determination of the scope of patent claims was made in a prior case, and the determination was essential to the judgment there on the issue of infringement, there is collateral estoppel in a later case on the scope of such claims." *Molinaro v. Fannon/Courier Corp.*, 745 F.2d 651, 655, 223 USPQ 706, 708 (Fed.Cir.1984).

Here, the district court and both parties agree that the claim interpretation of the Indiana case – that "the claim requires the coaction of the spreader means with the pin ends' inner edges which define the cavity" – controls in this case. They are correct. The prior claim interpretation has issue preclusive effect in the present case insofar as it was necessary to the judgment of non-infringement in the previous case. The dispute is whether the six devices charged with infringement here contain a spreader which coacts with inner edges defining the cavity. The answer to this question, and whether the question is a material factual dispute, is addressed in the next section.

B. Summary Judgment

1.

The sole ground for summary judgment, and thus the only issue on appeal, was that the spreader of each device does not press against an inner edge of the pins that defines the cavity. Pfaff argues that summary judgment was improper because (1) the district court erroneously defined the phrase "inner edge" in the claims to mean the physically innermost edge which contacts the chip, and (2) the court resolved a disputed material factual issue by finding that the spreaders of the Wells devices coact with the outer edge, not the inner edge, of the pins.

Pfaff contends that because the "inner edges" of the pins are defined by the cavity, "inner edge" should be interpreted to mean any inwardly facing surface of the pin which borders the cavity. According to Pfaff, the cavity is not limited to the immediate area where the chip

nests, but extends vertically along the entire length of the pins between the base support and the lid. The cavity is determined in part by the contact point where the spreader engages the pins. Pfaff asserts that the specification supports his interpretation; in Figs. 4-5 of the '377 patent, inclined edge 50 is an "inner edge" even though it does not contact the chip and in fact is laterally removed from the point 51a which does contact the chip. Thus, says Pfaff, an "inner edge" can include a point which never contacts the chip, as long as this point borders the cavity.

Wells asserts that the Indiana court and this court defined "cavity" as the immediate area in which the chip nests, and argues that Pfaff erroneously stretches the definition of "cavity" to include the entire area between the lid and the base. Wells states that its interpretation is supported by the requirement in claim 1 that the cavity substantially conform to at least two opposite lateral dimensions of the chip. Thus, says Wells, the "cavity" is the size of the chip and no larger.

Pfaff replies that prior litigation did not restrict the interpretation of "cavity" to the immediate nesting locale of the chip. In the Indiana case, the two accused devices each contained a spreader which contacted an arm extending laterally from the pin; these arms were clearly exterior to the central cavity. Pfaff also points out that the limitation in claim 1 that the cavity "substantially conform" to the size of the chip does not restrict the cavity to the exact area of the chip, and certainly says nothing about the vertical dimensions of the cavity.

We agree with Pfaff; nowhere did the Indiana court or this court construe "cavity" as the immediate nesting locale of the chip. In effect, Wells attempts to rewrite the prior claim interpretation – "inner edges which define the cavity" – to state "inner edges which contact the immediate nesting locale of the chip." Not only is Wells' proposed interpretation novel, but it also is inconsistent with the definition of "cavity" in the specification as the "central cavity defined by the blades 20b." *See SRI Int'l v. Matsushita Electric Corp. of Am.*, 775 F.2d 1107, 1117 n. 11, 1118, 227 USPQ 577, 582 n. 11, 583 (Fed.Cir.1985) (in banc) (claims are construed in light of the specification). In Figs. 2-3 and 4-5, we see that the area between blades 20b includes much more than the immediate area where the chip nests. The inner surface of each blade 20b extends vertically from the base to the spreader and includes a portion of the surface which appears laterally removed from the point which contacts the chip.

As we said above, neither party disputes that the proper claim interpretation requires a spreader which coacts with inner edges of the pins that define the cavity. The dispute is whether the accused devices meet this claim limitation, i.e. whether the accused spreaders coact with a point on the pins which is an 'inner edge' that defines the cavity or an 'outer edge' that does not define the cavity. The district court made a factual finding that the accused spreaders coact with a point that is not an inner edge defining the cavity.

We do not think that the district court could make such a factual finding based on the rough drawings, which were the only evidence before the district court

pertaining to the six devices.[3] In any case, by making such a factual finding the court improperly resolved a disputed material factual issue. *See Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 249, 106 S.Ct. 2505, 2510, 91 L.Ed.2d 202 (1986) ("at the summary judgment stage the judge's function is not himself to weigh the evidence and determine the truth of the matter but to determine whether there is a genuine issue for trial"); *Lemelson v. TRW, Inc.*, 760 F.2d 1254, 1260, 225 USPQ 697, 701 (Fed.Cir.1985) (fact-finding is an inappropriate exercise on summary judgment; "[i]f a dispute requiring a finding exists as to any material fact, summary judgment is improper.")

We note that, although Wells contended before the trial court that its devices differ from Pfaff's claims in other ways, those issues are not before us because the court explicitly refused to address Wells' other defenses. *See Cicena Ltd. v. Columbia Telecommunications Group*, 900 F.2d 1546, 1552, 14 USPQ2d 1401, 1407 (Fed.Cir.1990) (issues not decided by trial court are not before us on appeal); *Beloit Corp. v. Valmet OY*, 742 F.2d 1421, 1423-24, 223 USPQ 193, 195 (Fed.Cir.1984) (same). The sole basis for summary judgment was the district court's determination that the accused spreaders do not coact with the inner edges defining the cavity.

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[3] Defendant's exhibits D-1 and D-2 show devices in which the spreader appears to contact inner edges that define the cavity. Exhibits D-3 through D-6 are ambiguous on this point, but the evidence must be viewed in the light most favorable to Pfaff, the non-moving party, and reasonable inferences should be drawn in his favor. *See* C.R. Bard, 911 F.2d at 672, 15 USPQ2d at 1542.

2.

Pfaff also argues that prosecution history estoppel does not preclude him from relying on the doctrine of equivalents; specifically, nothing in the prosecution history prevents Pfaff from asserting that "inner edge" is any surface of the pin that faces the cavity between the base and the spreader. Pfaff asserts that his amendments of claim 1 to distinguish Pauza and Anhalt were not meant to distinguish devices such as Wells', which are very different from the devices disclosed in Pauza and Anhalt. Wells responds with the argument that the prosecution history estoppel issue was decided previously and is "law of the case."

In light of our discussion above, which vacates the summary judgment of noninfringement on the grounds of literal infringement, we need not address this issue in depth. Wells is correct that, in affirming the Indiana court, we agreed that the phrase "coacting with said opposed inner edges of said pins" was a limitation added to claim 1 to distinguish prior art. In that case, we stated that Wells' spreaders, which coacted with arms extending laterally from the pins, could not be construed as equivalents because they contacted 'outer edges' of the pins. However, in this case there remains a material factual dispute as to whether the accused spreaders coact with an 'inner edge' that defines the cavity or an 'outer edge' that does not. The existence of this question, which renders summary judgment on the literal infringement issue improper, likewise renders summary judgment improper on whether the accused spreaders infringe under the doctrine of equivalents.

C. Other Matters

Wells also asserts that Pfaff's appeal was frivolous because it attempted to relitigate issues already adjudicated, and Wells seeks damages and costs under Fed.R.App.P. 38. In view of our decision above, we do not find Pfaff's appeal to be frivolous.

CONCLUSION

We reverse the district court's summary judgment because it improperly resolved a genuine issue of material fact, and we remand for further proceedings.

Costs

Each party is to bear its own costs.

REVERSED AND REMANDED.

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

96-1150, -1187

WAYNE K. PFAFF,

Plaintiff/Cross-Appellant,

v.

WELLS ELECTRONICS, INC.,

Defendant-Appellant.

ORDER

United States Court of Appeals
for the Federal Circuit

ORDER

(Filed Oct. 3, 1997)

Before ARCHER, Chief Judge, PLAGER, Circuit Judge, and SCHALL, Circuit Judge.

A petition for rehearing having been filed by the CROSS-APPELLANT,

UPON CONSIDERATION THEREOF, it is

ORDERED that the petition for rehearing be, and the same hereby is, DENIED.

The mandate of the court will issue on October 10, 1997.

FOR THE COURT,
JAN HORBALY, CLERK

Dated: October 3, 1997

by /s/ Alex Van Veen
Alex Van Veen
Staff Law Clerk

cc: JAMES D. HALL
BARRY L. GROSSMAN

PFAFF V WELLS ELECTRONICS 6-1150, -1187
(DCT-91-CV-1542)

Note: Pursuant to Fed. Cir. R. 47.6, this order is not citable as precedent. It is a public record.

United States Patent [19]
Pfaff

[11] Patent Number: 4,491,377
[45] Date of Patent: Jan. 1, 1985

[54] MOUNTING HOUSING FOR LEADLESS CHIP CARRIER

[76] Inventor: Wayne K. Pfaff, 1316 Savannah, Irving, Tex. 75062

[21] Appl. No.: 369,347

[22] Filed: Apr. 19, 1982

[51] Int. Cl.³ H01R 13/62

[52] U.S. Cl. ..... 339/74 R; 339/17 CF; 339/75 M

[58] Field of Search .... 339/17 CF, 74 R, 75 M, 339/75 MP, 258 P

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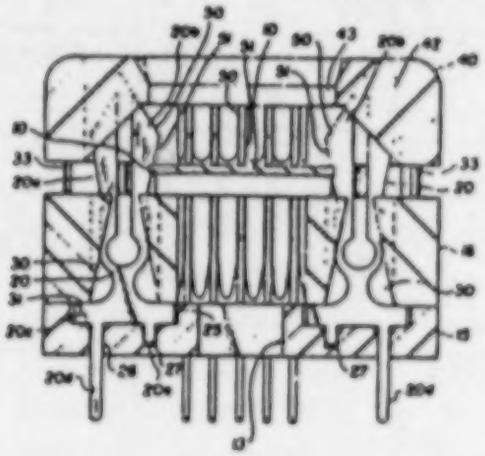
y Examiner – Z. R. Bilinsky

Attorney, Agent, or Firm – Kanz, Scherback & Timmons

[57] **ABSTRACT**

Disclosed is a mounting housing for leadless chip carriers for use on burn-in boards, circuit boards and the like. The housing includes an insulating base support containing a plurality of electrically conductive axially elongated bodies extending therethrough arranged to define a rectangular cavity in a plane parallel with the first major face of the base support. The ends of the axially elongated bodies defining the cavity have edges inclined inwardly toward the cavity and edges inclined outwardly from the cavity. A spreader mounted for reciprocal movement axially with respect the elongated bodies has an inclined surface mating with the outwardly inclined edges of the elongated bodies so that movement of the spreader moves the inwardly inclined edges outwardly to permit insertion of a leadless chip carrier within the cavity.

22 Claims, 5 Drawing Figures



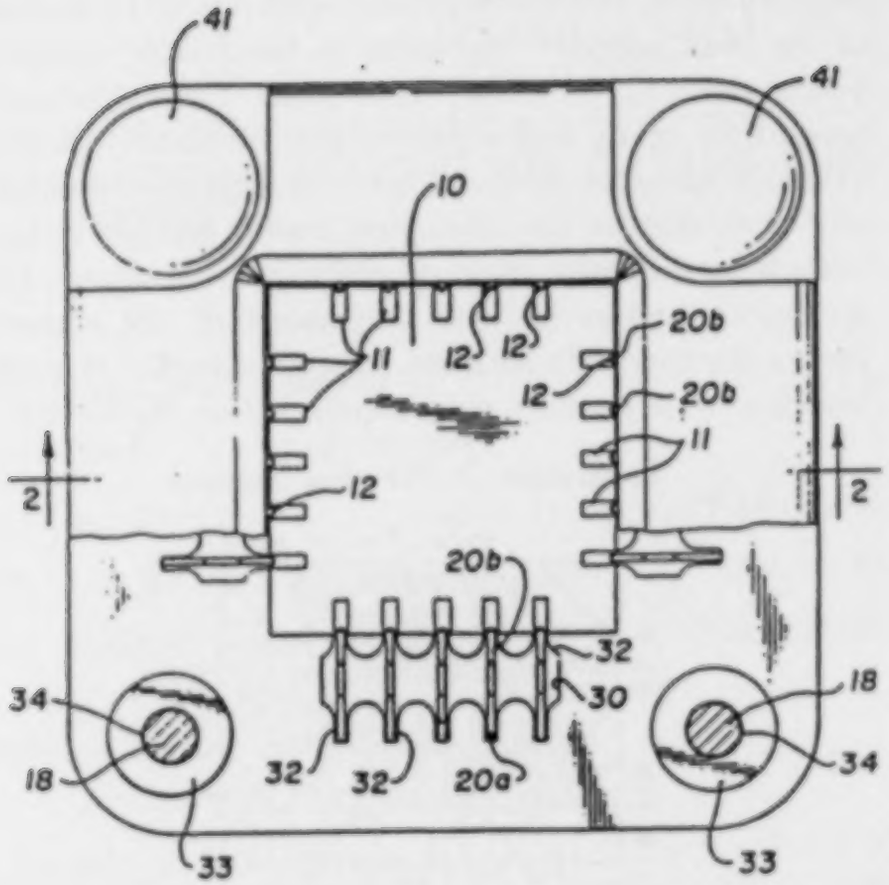


Fig. 1

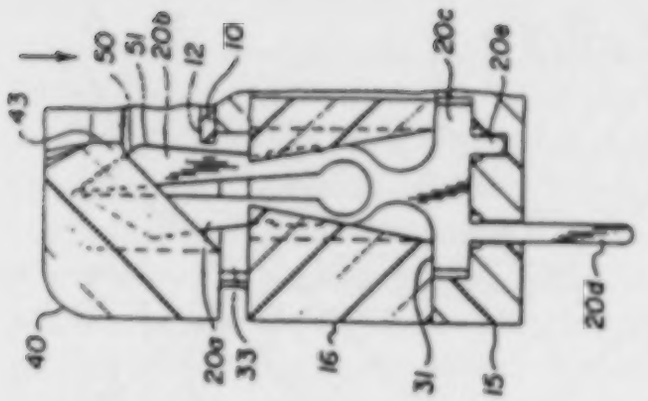


Fig. 3

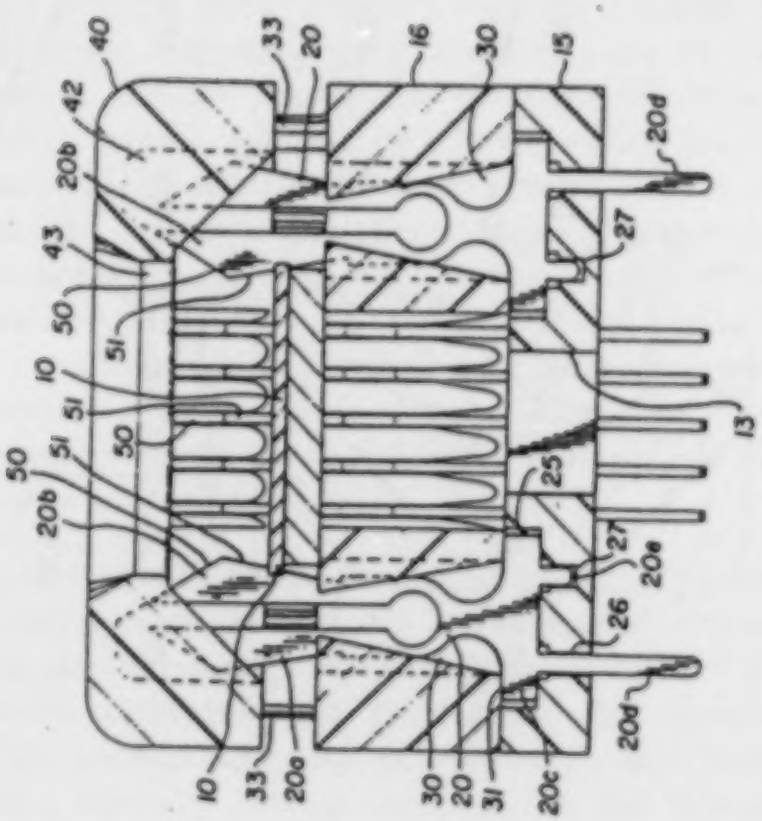


Fig. 2

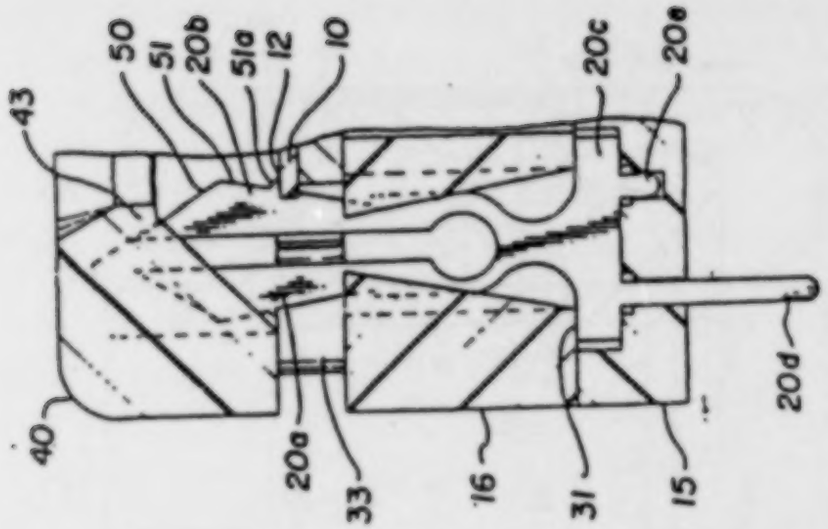


Fig. 5

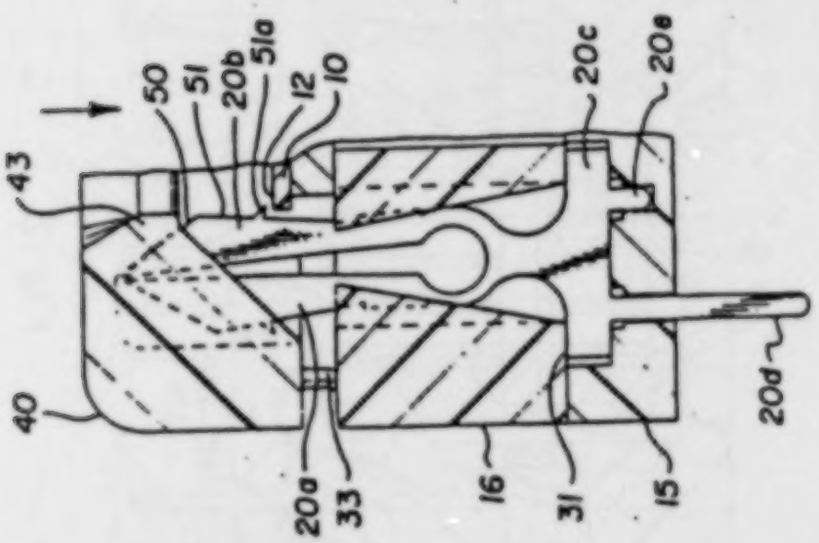


Fig. 4

MOUNTING HOUSING FOR LEADLESS CHIP CARRIER

As large scale integration (LSI) techniques are applied to integrated circuit and hybrid circuit development, the density of circuit functions which may be performed by a single circuit chip becomes limited, not by the electronic functions which can be performed by the Circuit chip, but by the packaging used to house the chip and the leads required for interconnecting the chip with other circuitry. Integrated circuits are conventionally housed in flat packs or dual in-line package (DIP) structures wherein interconnection leads are arranged in parallel rows extending from opposite sides of the chip housing. However, as the chip functions are expanded to require greater numbers of interconnection leads, standard DIP configurations pose serious limitations. For example, a sixty-eight pin array in conventional DIP packaging would require a DIP over three inches long. Because of impedence of the long leads required, such arrangements are unsuitable for high speed devices. Furthermore, such packages would consume an inordinate amount of circuit board area and pose problems in maintenance or replacement.

In response to the need for high density packaging for LSI devices, the industry has developed standard LSI chip carrier housings known in the art as leadless chip carriers. Conventionally, the leadless chip carrier comprises a substantially flat rectangular ceramic base piece with a centrally located cavity in one face thereof. The chip is mounted on the floor of the cavity and the cavity enclosed and hermetically sealed with a ceramic cover. Terminal lands are arranged on one or both sides of the

base piece adjacent each of the four edges of the base piece and electrical communication between the terminal lands and the enclosure housing the chip is provided by gold-plated leads or the like extending from the terminal lands to the cavity. The terminal lands may be on the front side (the major face of the base piece which carries the enclosure cover) or the back side (the side of the base piece opposite the enclosure cover) or both, depending on the design of the leadless chip carrier. Furthermore, the location and arrangement of the terminal lands may vary depending on the size of the carrier and the number of terminal lands.

Conventionally, leadless chip carriers as described above are mounted in mounting means for electrical interconnection with a circuit board or the like. Since the terminal lands must contact means for forming electrical communication between the circuit elements on the printed circuit board and the terminal lands, means must be provided in the mounting housing to accurately position and align the terminal lands with respect to such contact means.

While various leadless chip carrier sizes and configurations as generally described above have been adopted as industry standards for various pin connection arrangements, the means used for interconnecting such leadless chip carriers with circuit boards or the like and thus provide electrical communication between the terminal lands of the leadless chip carrier and the circuit board varies with the particular circuit application, the functions to be performed by the particular chip and other considerations. Thus no standard means has been

adopted for mounting leadless chip carriers on circuit boards or the like.

Obviously, various designs of leadless chip carrier interconnection means have been devised, each with its own unique characteristics and designed to satisfy certain requirements. Ordinarily, however, all prior mounting housings rely on registration of the mounting housing and leadless chip carrier by reference to an edge of the ceramic base piece to align the contact means of the mounting housing with the terminal lands on the leadless chip carrier. Since the position of the contact means with respect to the mounting housing is fixed, the position of the lands with respect to the edge of the base piece must be precisely fixed to insure that the contact means are in proper registry with the lands. Furthermore, the contact means are usually arranged to extend in a direction transverse to the plane of the lands, thus project upwardly and/or downwardly from the mounting housing and/or the mounting housing cover, thus contacting the lands on the broad surfaces thereof.

Unfortunately, the ceramic base piece of many leadless chip carries is not machined to provide precision edges. Instead, the base piece is formed from a larger sheet of ceramic material by forming a plurality of precisely aligned holes in the sheet and/or scribing the sheet on one or both faces and breaking the sheet along the scribe line or aligned series of holes. Obviously, the break line which forms the edges of the base piece may or may not be precisely aligned with the holes or scribe line. However, the terminal lands are formed on the base piece at precise locations with reference to the holes or scribe line, not the actual edge of the body. Thus, where the

actual edge of the body does not precisely coincide with the scribe line or line defined by the centers of the holes, and where the contact means carried by the mounting housing is aligned to contact the terminal lands by reference to the actual ledge of the base piece, misalignment between the contact means and the terminal lands often occurs. This results in failure to form proper electrical contact between the contact means and the terminal lands.

In accordance with the present invention, a mounting housing is provided in which the contact means are aligned with the terminal lands by reference to the holes used to define the desired edge of the ceramic base piece. Since the contact means references the only precision formed reference point on the base piece, the contact means is always precisely located on the terminal land. Furthermore, where the land is formed with reference to the holes, the land material usually extends into the hole. The contact means of the housing of the invention extend substantially vertically (with respect to the horizontal plane of the base piece), thus the contact means may actually engage the land in the semi-cylindrical portion of the hole formed to define the edge of the base piece. Thus precise registration between the land and the contact means is achieved using the only precision reference point on the base piece.

The invention further provides means for rapid mounting and de-mounting of leadless chip carriers by aligning the contact means substantially vertically (with respect to the horizontal plane of the base piece) and surrounding all edges of the base piece. The contact means are resilient metal pins with outwardly sloping

camming surfaces which mate with a spreader to uniformly and simultaneously spread the contact pins and to permit insertion and removal of the leadless chip carrier from the housing. Thus the housing of the invention provides a compact and simplified means for rapidly mounting and de-mounting leadless chip carriers for burn-in, testing and for circuit applications use. Furthermore, the contact pins are automatically correctly precision positioned to mate with the terminal lands.

Other features and advantages of the invention will became more readily understood from the following detailed description taken in connection with the appended claims and attached drawings in which:

FIG. 1 is a top plan view of a twenty pin version of the preferred embodiment of the invention;

FIG. 2 is a sectional view of the apparatus of FIG. 1 taken through section lines 2–2;

FIG. 3 is a sectional view of a portion of the apparatus of FIG. 1 taken through section lines 2–2 illustrating the action of the spreader to open the contact means; and

FIGS. 4 and 5 are sectional views of the same portion of the apparatus as shown in FIG. 3 illustrating an alternative embodiment of the contact means.

In FIG. 1, a typical twenty pin leadless chip carrier 10 is shown having five terminal lands 11 on the top surface of each edge thereof. Since the arrangement of the semiconductor chip within the cavity of the carrier and the interconnection of the chip with the lands 11 form no part of the invention, these details of the leadless chip carrier are not illustrated. However, the base portion of the

leadless chip carrier in the embodiment shown is characteristic of ceramic base pieces formed by breaking the ceramic along a line of small holes. Therefore, the edge of the base piece has semicylindrical depressions 12 vertically traversing each lateral edge thereof. The lands 11 positioned on one or both faces of the leadless chip carrier 10 are indexed to the depressions 12 and usually extend into the depressions 12.

The structure of the mounting housing is most clearly illustrated in FIG. 2. In the preferred embodiment, the housing comprises a base support 15; an intermediate support housing 16 which cooperates with the base support 15 to hold and position contact pins 20; and a spreader 40. The assembly is secured together by a plurality of studs 18 (shown in FIG. 1). The studs 18 secure the base support 15 and intermediate support housing 16 rigidly together and extend through spreader 40 permitting spreader 40 to move with respect to the remainder of the assembly as explained hereinafter.

In the preferred embodiment, the contact pins 20 are substantially flat axially elongated resilient electrically conductive bodies such as stainless steel coated with a suitable electrically conductive coating or beryllium copper alloys or the like formed with a pair of parallel arms or blades 20*a* and 20*b* extending from a common base 20*c*. Each pin 20 has one pin shank 20*d* and one index stud 20*e* extending from the base 20*c* in the direction opposite the blades 20*a* and 20*b*. The contact pin 20 is symmetrical about its longitudinal (vertical as shown in the drawings) axis except that the shank 20*d* is substantially longer than the index stud 20*e*.

The base 20*c* fits within a recess 25 in base support 15 with shank 20*d* extending through aperture 26 and index stud 20*e* fitted within indexing recess 27. Thus shank 20*d* extends vertically through the base support 15 to provide electrical connection with a substrate such as a circuit board or burn-in board or other socket or support means. It will be observed that aperture 26 and indexing recess 27 may be arranged in alternately reversed positions so that a plurality of shanks 20*d* project from the bottom surface of the base support 15 in parallel rows with the positions of the shanks 20*d* in each row staggered with respect to the shanks in the other row. Alternatively, aperture 26 and recess 27 may be identical apertures. Thus shanks 20*d* may be alternately reversed or all arranged in the same row.

The depth of recess 25 in the base support 15 is substantially equal to the vertical height of the base 20*c* of the pin member 20 so that the intermediate support housing 16, when mated with base support housing 15, locks the base 20*c* within the recess 25. The intermediate support housing 16 has outer lateral dimensions substantially conforming to the outer lateral dimensions of the base support 15 and has vertical channels 30 extending there through which align with the recesses 25. However, channels 30 are not as wide as the recesses 25, thus the shoulders 31 of the intermediate support 16 extend over the base 20*c* and secure the contact pin body within the housing. The internal surfaces of the channels 30 are provided with parallel slots 32 (most clearly shown in FIB. 1) aligned with the recesses 25 and apertures 26 to receive the blades 20*a* and 20*b* of the pin, thus supporting the pins 20 vertically and parallel with each other. It will

thus be observed that with intermediate support housing 16 mated with base support 15, the pins 20 are secured vertically and parallel to each other in groups aligned in four rows defining a central rectangular area on the top surface of the intermediate support member 16.

In the preferred embodiment, the base support 15 and the intermediate housing support 16 have aligned apertures 34 extending vertically therethrough at each corner. The intermediate support 16 also has a post 33 on the top surface thereof surrounding each aperture 34., The base support 15 and intermediate support housing 16 are held firmly together by studs 18 passing through the apertures 34.

A spreader cap 40 having outer lateral dimensions substantially conforming to the outer lateral dimensions of the base support 15 and intermediate support housing 16 is mounted for vertical reciprocal movement on the posts 33. Preferrably, the spreader cap 40 has apertures in the corners thereof in registry with the posts 33 and thus rides on the posts. The studs 18 have enlarged ends 41 for retaining the spreader cap on the assembly. The spreader cap 40 has a central rectangular cavity 42 which is larger than the rectangular area defined by the top ends of the pins 20. However, the top surface of the spreader cap 40 has an inwardly and downwardly projecting lip 43.

As most clearly illustrated in FIGS. 2 and 3, the pin 20 is forked at about its mid-section to form blades 20*a* and 20*b* which project above the surface of the intermediate support housing 16. The outer edge of each blade 20*a* and 20*b* also diverges outwardly from the vertical axis of the pin 20 to a point near the top free end thereof and

then diverges inwardly. The inwardly and downwardly projecting lip 43 is adapted to mate with and rest on the inwardly diverging edge 50 of each pin 20. It will thus be observed that as the spreader cap 40 is moved downwardly (as illustrated by the arrow in FIG. 3) the lip 43 acts as a camming surface against the edges 50 of the pins, thus bending the blades 20*b* toward the central axes of the pins 20 and outwardly with respect to the central cavity defined by the blades 20*b*. As the spreader cap 40 is uniformly pressed toward the support 16, all the inner blades 20*b* of the pins 20 are urged outwardly from the central cavity, thus aligning the otherwise inwardly inclined edges 51 substantially vertically. Since the central opening in the spreader cap 40 is slightly larger than the leadless chip carrier 10, and since the pins 20 are spread outwardly by the spreader cap 40, a leadless chip carrier may be inserted through the spreader cap 40 into the central cavity to rest on the top surface of the intermediate support 16. When downward pressure on the spreader cap 40 is released, the inner blades 20*b* return to their relaxed position (see FIG. 2) and engage the edges of the leadless chip carrier.

Where the terminal lands 11 are aligned with and extend into the semicylindrical depressions 12 on the edges of the leadless chip carrier base piece (as illustrated in FIG. 1), and where the pins 20 are spaced to likewise mate with the depressions 12, the inclined edges 51 of he blades 20*b* are urged into the depressions 12 to form physical and electrical contact with the lands 12. Furthermore, since the edges 51 are inclined inwardly from the vertical, the blades 20*b* securely lock the leadless chip carrier within the mounting housing.

The above described embodiment is particularly suitable for use in connection with leadless chip carriers wherein the ceramic base piece is formed by drilling holes therein and breaking the ceramic wafer along the line of holes. In such cases, the lands 11 are usually formed in registry with the semicylindrical depressions 12 formed by the breaking hole and thus the blades 20*b* are automatically aligned with the lands 11 and engage the lands within the semicylindrical depressions 12. Note that in this arrangement the contact means (the blades 20*b*) are indexed with the lands by reference to the semicylindrical depressions 12 which are the only precision-located points on the ceramic base piece. Since the electrical contact means 20*b* are not indexed with reference to any other portion of the ceramic base piece, precision and accurate indexing is always achieved.

Some leadless chip carriers are not formed by drilling holes in the ceramic base piece. Therefore, semicylindrical depressions 12 are not present and can not be used to index the lands 12. In such cases, the lands 12 may be formed only on one surface, on both surfaces, or actually wrapped around the lateral edges of the base piece. However, if the lands are wrapped around the edges, the above embodiment performs equally well since electrical contact is made between the portion of the land wrapped around the edge of the ceramic base and blade 20*b*. If, however, the ceramic base piece of the leadless chip carrier has no semicylindrical depression 12 to act as an indexing means and the land 11 does not extend around the edge of the ceramic base piece, the blades 20*b* may be modified as illustrated in FIGS. 4 and 5.

In the embodiment of FIGS. 4 and 5 the outwardly divergent edge 51 of blade 20*b* is modified to include an outwardly and downwardly extending barb 51*a*. Thus, when the spreader cap 40 is depressed, the blades 20*b* are withdrawn laterally to permit the leadless chip carrier to be positioned within the cavity. However, when the spreader cap 40 is released, the blades 20*b* move inwardly urging barbs 51*a* inwardly and downwardly into contact with the top surface of the lands 11. Since the barbs 51*a* move both laterally and downwardly when the blades 20*b* are released, the barbs 51*a* scrape the surface of the lands 11 to remove any oxidation thereform and thus form good electrical contact with the lands 11 while also acting to retain the leadless chip carrier within the cavity.

It should be noted that the structure of the embodiment described is extremely simple and may be readily fabricated from available materials. For example, the housing may be made from three pieces of insulating material such as molded or machined plastic or the like. The pins 20 are symmetrical about their longitudinal axes (except for the lengths of shanks 20*d* and studs 20*e*), thus may be all identical and simply alternately reversed during assembly to provide parallel rows of pins. Furthermore, a centrally located aperture 13 may be provided in the base support 15 to permit cooling of the leadless chip carrier by convection or by a heat sink attached to the leadless chip carrier and projecting into the cavity. Likewise, since the top of the housing is open, a heat sink may be attached to the top side of the leadless chip carrier 10 and project through the central opening in the spreader cap 40.

It will be noted that no special tools are required to insert the leadless chip carrier into the housing of the invention. The leadless chip carrier is simply inserted within the opening in the central portion of the spreader cap 40 and the spreader 40 pressed toward the intermediate support 16. As the blades 20*b* retract laterally, the leadless chip carrier 10 simply drops into position on the top surface of the intermediate support housing. When the spreader cap 40 is released, the blades 20*b* automatically align with and form electrical contact with the lands 11.

Removal of the leadless chip carrier 10 from the housing is accomplished with similar ease. By pressing the spreader cap 40 toward the intermediate support housing 16, the blades 20*b* are retracted and the leadless chip carrier may be withdrawn from the housing by simply inverting the structure; by inserting a plunger or other suitable instrument through the aperture 13; or by other suitable simple and convenient means.

It should be noted that the housing of the invention is extremely compact and has no moving closure led or the like. Thus the housing may be inexpensively manufactured and occupies minimum space on a mounting substrate. Furthermore, the housing can be designed to accommodate leadless chip carriers of various configurations without modification of the basic design of the housing.

Because of the simplicity of design and the ease with which leadless chip carriers may be inserted into and withdrawn from the housing of the invention, the housing has particular applicability and suitability for use in

connection with burn-in boards wherein large numbers of leadless chip carriers are mounted in housings on a burn-in board and tested and stressed under adverse conditions. The housing is likewise applicable for use as a housing or mounting socket for end use circuit applications. Accordingly, while the invention has been described with particular reference to specific embodiments thereof, it is to be understood that the forms of the invention shown and described in detail are to be taken as preferred embodiments of same, and that various changes and modifications may be resorted to without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

1. Mounting means for a leadless chip carrier comprising:

(a) base support means having first and second oppositely disposed major faces;

(b) a plurality of axially elongated conductive pins passing transversely through said base support means substantially perpendicular to said first and second major faces, the opposed inner edges of the ends of said pins extending from said first major face arranged to define a cavity substantially conforming to at least two oppositely disposed lateral peripheral dimensions of said leadless chip carrier in a plane parallel with said first major face and the inner edges of said pins converging slightly inwardly with distance from said first major face; and

(c)unitary means operable independently of said leadless chip carrier reciprocally movable axially with respect to said pins and coacting with said opposed inner edges of said pins for uniformly spreading the ends of said pins extending from said first major face to permit the insertion of a leadless chip carrier therebetween.

2. Mounting means as defined in claim 1 wherein each of said conductive pins comprises a substantially flat elongated conductive body with a centrally located base portion, a shank and an index stud extending parallel in a first direction from said base portion and a pair of blades extending parallel in the opposite direction from said base portion, said conductive pin body being substantially symmetrical about its central axis except for the relative lengths of said index stud and said shank.

3. Mounting means as defined in claim 2 wherein said base support means includes a plurality of recesses adapted to mate with and receive said base portions of said pins to support said pins with their axes parallel and normal to said first and second major faces.

4. Mounting means as defined in claim 2 wherein said base support means comprises a first base support means including recesses for receiving said base portions of said pins and an intermediate support housing mating with the first major face of said first base support means and having a plurality of channels passing therethrough, said channels each having slots in the walls thereof for receiving the outer edges of said blades.

5. Mounting means as defined in claim 4 including stud means passing through said first base portion, said

intermediate support housing and said means for spreading the ends of said pins, said stud means rigidly securing said first base portion and said intermediate support housing together with said pins extending normal to said first and second major faces while permitting said means for spreading the ends of said pins to reciprocally move axially with respect to said stud means.

6. Mounting means as defined in claim 1 wherein said means for for [sic] spreading the ends of said pins comprises a rectangular body adapted for reciprocal movement parallel with the axes of said pins and having a central cavity therein greater in lateral dimensions than the lateral area defined by said pins and including camming means for mating with the ends of said pins to urge the free ends of said pins outwardly with respect to said cavity as the spreading means is moved axially with respect to said pins.

7. Mounting means for a leadless chip carrier comprising:

(a) a support housing having first and second oppositely disposed major faces;

(b) a plurality of axially elongated contact means mounted within said support housing and extending therethrough with their axes aligned parallel to each other and normal to said first and second major faces, the free ends of said contact means extending from said first major face arranged with their inner edges defining a cavity rectangular in dimensions in a plane substantially parallel with said first major face, the ends of said contact means defining said cavity having edges which incline inwardly

toward said cavity in said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel with said first major face; and

(c) unitary spreader means comprising a substantially rectangular body arranged substantially parallel with said first major face and reciprocally movable axially with respect to said contact means, said spreader means having a surface inclined with respect to the axes of said contact means and mating with said inclined inner edges of said contact means whereby movement of said spreader means axially with respect to said contact means in a first direction urges said free ends of said contact means outwardly with respect to said cavity.

8. Mounting means as defined in claim 7 including a plurality of stud means extending from said first major face of said support housing parallel with said contact means.

9. Mounting means as defined in claim 8 wherein said spreader means is mounted for reciprocal movement on said stud means.

10. Mounting means as defined in claim 7 including a centrally located aperture in said support housing.

11. Mounting means as defined in claim 7 wherein the inwardly inclined edges of said contact means include an inwardly projecting barb.

12. Mounting means as defined in claim 7 wherein said axially elongated contact means comprises a plurality of substantially flat axially elongated electrically conductive bodies, each having a substantially centrally located base portion confined within said support housing and having a shank portion extending therefrom in a first direction through said second major face of said support housing and a pair of parallel blades extending in the opposite direction therefrom on opposite sides of the central axis of said contact means.

13. Mounting means as defined in claim 12 wherein said support housing includes a plurality of apertures in said second major face thereof arranged in parallel rows for receiving said shank portions.

14. Mounting means as defined in claim 13 wherein said contact ıneans are arranged in said support housing in alternately reversed positions so that said shank portions project through said apertures in parallel rows with location of the shank portions alternately staggered in each row.

15. Mounting means for a leadless chip carrier comprising:

(a) base support means having first and second oppositely disposed major faces;

(b) a plurality of conductive pins passing transversely through said base support means substantially perpendicular to said first and second major faces, the ends of said pins extending from said first major face arranged to define a cavity substantially conforming to at least two oppositely disposed lateral peripheral dimensions of

said leadless chip carrier in a plane parallel with said first major face and the inner edges of said pins converging slightly inwardly with distance from said first major face, each of said conductive pins comprising a substantially flat elongated conductive body with a centrally located base portion, a shank and an index stud extending parallel in a first direction from said base portion and a pair of blades extending parallel in the opposite direction from said base portion, said conductive pin body being substantially symmetrical about its central axis except for the relative lengths of said index stud and said shank; and

(c) means operable independently of said leadless chip carrier and coacting with said inner edges of said pins for uniformly spreading the ends of said pins extending from said first major face to permit the insertion of a leadless chip carrier therebetween.

16. Mounting means as defined in claim 15 wherein said base support means includes a plurality of recesses adapted to mate with and receive said base portions of said pins to support said pins with their axes parallel and normal to said first and second major faces.

17. Mounting means as defined in claim 15 wherein said base support means comprises a first base support means including recesses for receiving said base portions of said pins and an intermediate support housing mating with the first major face of said first base support means and having a plurality of channels passing therethrough,

said channels each having slots in the walls thereof for receiving the outer edges of said blades.

18. Mounting means as defined in claim 17 including stud means passing through said first base portion, said intermediate support housing and said means for spreading the ends of said pins, said stud means rigidly securing said first base portion and said intermediate support housing together with said pins extending normal to said first and second major faces while permitting said means for spreading the ends of said pins to reciprocally move axially with respect to said stud means.

19. Mounting means for a leadless chip carrier comprising:

(a) a support housing having first and second oppositely disposed major faces;

(b) a plurality of axially elongated contact means mounted within said support housing and extending therethrough with their axes aligned parallel to each other and normal to said first and second major faces, the free ends of said contact means extending from said first major face arranged to define a cavity rectangular in dimensions in a plane substantially parallel with said first major face, the ends of said contact means defining said cavity having edges which incline inwardly toward said cavity in said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel with said first major face;

(c) spreader means comprising a substantially rectangular body arranged substantially

parallel with said first major face and reciprocally movable axially with respect to said contact means, said spreader means having a surface inclined with respect to the axes of said contact means and mating with the inclined inner edges of said contact means whereby movement of said spreader means axially with respect to said contact means in a first direction urges said free ends of said contact means outwardly with respect to said cavity; and

(d) barb means projecting inwardly from the inwardly inclined edges of said contact means.

20. Mounting means for a leadless chip carrier comprising:

(a) a support housing having first and second oppositely disposed major faces;

(b) a plurality of axially elongated contact means mounted within said support housing and extending therethrough with their axes aligned parallel to each other and normal to said first and second major faces, the free ends of said contact means extending from said first major face arranged to define a cavity rectangular in dimensions in a plane substantially parallel with said first major face, the ends of said contact means defining said cavity having edges which incline inwardly toward said cavity in said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel with said first major face, said axially elongated contact means comprising substantially flat axially elongated electrically

conductive bodies, each having a substantially centrally located base portion confined within said support housing and having a shank portion extending therefrom in a first direction through said second major face of said support housing and a pair of parallel blades extending in the opposite direction therefrom on opposite sides of the central axis of said contact means; and

(c) spreader means comprising a substantially rectangular body arranged substantially parallel with said first major face and reciprocally movable axially with respect to said contact means, said spreader means having a surface inclined with respect to the axes of said contact means and mating with the inclined inner edges of said contact means whereby movement of said spreader means axially with respect to said contact means in a first direction urges said free ends of said contact means outwardly with respect to said cavity.

21. Mounting means as defined in claim 20 wherein said support housing includes a plurality of apertures in said second major face thereof arranged in parallel rows for receiving said shank portions.

22. Mounting means as defined in claim 21 wherein said contact means are arranged in said support housing in alternately reversed portions so that said shank portions project through said apertures in parallel rows with location of the shank portions alternately staggered in each row.

* * *

Distict Court, N. D. Indiana

Pfaff v. Wells Electronics Inc.

No. S86-449

Decided July 26, 1988

Action by Wayne K. Pfaff against Wells Electronics Inc., for patent infringement, in which defendant counterclaims for declaration of patent invalidity. Judgment for defendant on issue of infringement, and for plaintiff on issue of patent validity.

Jack A. Kanz, Dallas, Tex., and Timothy J. Hartzer, South Bend, Ind., for plaintiff.

James D. Hall and Thomas J. Dodd, South Bend, for defendant.

Miller, J.

This case came before the court for trial without intervention of a jury on July 18-20, 1988. This memorandum is intended to comply with the requirements of Fed.R.Civ.P. 52(a).

This is a patent infringement suit filed by Wayne K. Pfaff, a resident of Irving, Texas, against Wells Electronics, Inc., an Indiana corporation having its principal place of business in the Northern District of Indiana. Mr. Pfaff is the owner of Plastronics, Inc., which competes with Wells. The court has jurisdiction of the subject matter of this action pursuant to 28 U.S.C. §1338(a) and 35 U.S.C. §281. Venue in this court is proper pursuant to 28 U.S.C. §§1391(c), 1400(b).

Mr. Pfaff filed this action alleging that Wells was infringing Mr. Pfaff's patent. Wells filed a counterclaim contending that Mr. Pfaff's patent is invalid. For the reasons that follow, the court concludes that the Wells device does not literally infringe upon Mr. Pfaff's patent and that the doctrine of prosecution estoppel precludes Mr. Pfaff from resorting to the doctrine of equivalents to support his contention of infringement. The court further finds that Wells has not met its burden of overcoming the presumption of validity to which Mr. Pfaff's patent is entitled.

I. The Devices at Issue

A. The Pfaff Invention

Mr. Pfaff is the inventor and owner of all right, title and interest in the patent-in-suit, U.S. Patent No. 4,491,377, issued January 1, 1985. The invention of the patent-in-suit pertains generally to the art of semiconductor packing and mounting devices, or sockets, as they are known in the trade. More particularly, the patent-in-suit pertains to holding of mounting housings, or sockets, for leadless chip carriers during testing of the leaderless chip carriers.

In the state of today's semiconducter art, a multiple of electronic components or circuits can be etched in a silicon wafer, commonly referred to as an integrated circuit, which is housed within a ceramic or plastic carrier for protection. Integrated circuits conventionally are housed in dual in-line packages having interconnection leads adapted for attachment by insertion through printed circuit boards. The leads of such packages or

carriers assumed a variety of configurations, such as L-shapes and J-shapes. During recent years, in response to the need for high-density packaging for integrated circuit devices, the industry has developed a package that dispenses with the need for conventional leads in favor of terminal lands, or contact pads, around the periphery of a square or rectangular ceramic or plastic housing known in the art as leadless chip carrier.[1]

The invention of the patent-in-suit addressed the problem of providing a housing or socket for mounting and testing leaderless chip carriers.

Mr. Pfaff's socket contains a lid atop a device containing several conductive pins that define a rectangular shape the size of a leaderless chip carrier. The top contains a hole of approximately the same shape and size. The socket is designed to allow "zero force insertion", meaning that no force need be exerted on the leaderless chip carrier to place it into the socket and actuate the pins. To insert the leaderless chip carrier, one depresses the socket's lid, which presses against the conductive pins, spreading them outward to increase the cavity's size. The leaderless chip carrier is placed into the cavity. When the lid is raised, the conductive pins spring back to something near their original position, contacting the leaderless chip carrier on its sides and its top near the

[1] Some leaderless chip carriers actually have small J-type leads that wrap around an edge of the carrier and are adapted for surface mounting of the carrier on a printed circuit board rather than insertion through the circuit board. More precisely, "leaderless chip carrier" is a term of art designating a surface-mountable chip carrier.

sides. The contacts between the leaderless chip carrier and the conductive pins allow the leaderless chip carrier to be activated for testing purposes while holding the leaderless chip carrier in place. Many such sockets then may be placed on a "burn-in-board" for testing.

Development of the device began in late 1980 or 1981, when Texas Instruments representatives approached Mr. Pfaff and others and described their need for a device to test leaderless chip carriers. Mr. Pfaff proceeded to conceptualize the device. By April 8, 1981, a drawing, known as P2020 (Defendant's Exhibit BHA) existed. On that date, Plastronics received a written order confirming a March 17, 1981 verbal order from Delta V for nearly 30,000 carrier sockets that would have the characteristics described by the conceptual drawings. The order was expressly conditioned upon the product functioning to the purchaser's satisfaction; such conditions are customary in Mr. Pfaff's business.

Not until several weeks after April 8, 1981 were any of the component parts of the socket produced. Nothing related to the invention existed before April 19, 1981 other than drawings and the inventor's mental impressions. The socket was not tested until after it was shipped to the purchaser in August, 1981.

B. The Patent-in-Suit

On April 19, 1982, Mr. Pfaff filed a patent application in the United States Patent Office entitled, "Mounting Housing for Leadless Chip Carrier". On October 4, 1983, the patent examiner rejected that application as being obvious in light of prior patented socket or connector

devices. On December 5, 1983, Mr. Pfaff filed a response that included an amendment to the claim of the application emphasizing "means operable independently of said leadless chip carrier and coacting with said inner edges of said pins . . . " Mr. Pfaff explained in his response, "Claim 1 has thus been amended to clearly note that the spreader means operates on the inner edges of the pins (as contrasted to the outer edges as shown in Pauza, et al.)." (Defendant's Exhibit B).

The patent examiner again rejected Mr. Pfaff's patent application on March 29, 1984 in light of prior patented socket devices. On June 22, 1984, Mr. Pfaff filed a second amendment to the claims attempting to traverse the examiner's rejection and emphasizing "axially elongated conductive pins", "opposed inner edges of the ends of said pins", and a "unitary top reciprocally movable axially with respect to said pins" and "coacting with said opposed inner edges".

The examiner granted the application on September 25, 1984; Mr. Pfaff's patent was issued January 1, 1985. Claim 1 of the patent-in-suit reads as follows:

> 1. Mounting housing for a leadless chip carrier comprising:
>
> (a) base support means having first and second oppositely disposed major faces;
>
> (b) a plurality of axially elongated conductive pins passing transversely through said base support means substantially perpendicular to said first and second major faces, the opposed inner edges of said ends of said pins extending from said first and second major faces, the opposed inner edges of said ends of said pins

> extending from said first major face arranged to define a cavity substantially conforming to at least two oppositely disposed lateral peripheral dimensions of said leadless chip carrier in a plane parallel with said first major face and the inner edges of said pins converging slightly inwardly with distance from said first major face; and
>
> (c) unitary means operable independently of said leadless chip carrier reciprocally moveable axially with respect to said pins and coacting with said opposed inner edges of said pins for uniformly spreading the ends of said pins extending from said first major face to permit the insertion of a leadless chip carrier therebetween.

Claim 6 of the patent-in-suit reads:

> 6. Mounting means as defined in claim 1 wherein said means for for [sic] spreading the ends of said pins comprises a rectangular body adapted for reciprocal movement parallel with the axes of said pins and having a central cavity therein greater in lateral dimensions than the lateral area defined by said pins and including a camming means for mating with the ends of said pins to urge the free ends of said pins outwardly with respect to said cavity as the spreading means is moved axially with respect to said pins.

Claim 7 of the patent-in-suit reads as follows:

> 7. Mounting means for a leadless chip carrier comprising:
>
> (a) a support housing having first and second oppositely disposed major faces;

(b) a plurality of axially elongated contact means mounted within said support housing and extending therethrough with their axes aligned parallel to each other and normal to said first and second major faces, the free ends of said contact means extending from said first major face with their inner edges defining a cavity rectangular in dimensions in a plane substantially parallel with said first major face, the ends of said contact means defining said cavity having edges which incline inwardly toward said cavity in said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel with said first major face; and

(c) unitary spreader means comprising a substantially rectangular body arranged substantially parallel with said first major face and reciprocally moveable axially with respect to said contact means, said spreader means having a surface inclined with respect to the axes of said contact means and mating with said inclined inner edges of said contact means whereby movement of said spreader means axially with respect to said contact means in a first direction urges said free ends of said contact means outwardly with respect to said cavity.

(Plaintiff's Exhibit 3).

C. The Wells Device

Meanwhile, Wells had begun researching the development of a leaderless chip carrier socket in late 1982, independently of Mr. Pfaff. Wells had long been in the business of selling sockets for testing semiconductor

devices, including its TO-5 device for housing leaded chip carriers. Wells had a line of zero-insertion-force sockets making use of moveable caps, but none for leaderless chip carriers. Upon receiving an inquiry from Delco in late 1982 concerning sockets for leaderless chips [sic] carriers, Wells designed a socket that was a less expensive direct force model rather than a zero-insertion force model. Wells' proposal to Delco was unsuccessful; Plastronics was awarded the contract.

Still, Wells did not begin emphasizing development of such a product until late 1983, when it appeared that surface mount technology had "arrived". An intense design effort began in January, 1984. By May, 1984, Wells had devised a leaderless chip carrier socket similar to Mr. Pfaff's, except that it contacted the carrier on the sides and the bottom. In May, 1984, Arthur Midili, Wells' president and chief operating officer, met Mr. Pfaff at a trade show. They showed each other their chip carrier sockets, and Mr. Pfaff told Mr. Midili that he had applied for a patent.

Unable to obtain a copy of the patent application, Wells continued with its development. Around July, 1984, Wells had settled on a design quite similar to Mr. Pfaff's device. In late 1984, as Wells was prepared to begin production, it learned that Mr. Pfaff's patent was to be issued. Wells obtained a copy of the patent through its attorney. Upon examining the claims, Wells chose to modify its design to avoid an infringement claim.

Wells modified its design by extending the lid outward and extending an arm outward from the side of a

serpentine-shaped contact, which was to be used to actuate the device's assembly.[2] Under this design, the lid of the socket would be depressed and urge the arm downward, forcing the contact away from the cavity into which the leaderless chip carrier was to be placed; the contacts would spring back when the top was raised and the pressure on the arms removed, contacting the sides of the leaderless chip carrier. Patent No. 4,623,208 ultimately was issued for this design on November 18, 1986.[3]

Wells made further modifications to its design, however, because the design did not work as well as the earlier design it had abandoned in the face of the Pfaff patent. A hump was added to the arm; the hump was rounded; the coil spring was made smaller; the contact point was made smaller and reshaped. Wells began shipping its revised socket construction to customers in 1985. On July 31, 1986, Mr. Pfaff filed this suit alleging infringement of his patent. Wells has modified its design during the pendency of this action, but neither Wells nor Mr. Pfaff have suggested that the modification is pertinent to the infringement issue.

II. Infringement

Mr. Pfaff contends that the Wells device infringes his patent literally and through the doctrine of equivalents.

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[2] A model of this design is shown as Revision D on defendant's Exhibit BPE.

[3] That Wells obtained a patent on its device does not preclude a finding of infringement. *Atlas Powder Co. v. E.I. Dupont de Nemours*, 750 F.2d 1539, 1580-1581 [224 USPQ 409, 416-417] (Fed. Cir. 1984).

Mr. Pfaff bears the burden of proving infringement by a preponderance of the evidence. *B & J Manufacturing Co. v. Hennessey Industries, Inc.*, 493 F.Supp. 1105 [206 USPQ 542] (N.D. Ill. 1979).

A. Literal Infringement

With respect to his claim of literal infringement, Mr. Pfaff must prove the existence of every element or part or its functional equivalent in the accused device. *Berkey Photo, Inc. v. Klimsch-Repro, Inc.*, 388 F.Supp. 586 [185 USPQ 306] (S.D.N.Y. 1975). The court must compare the asserted claims with the accused product. *Amstar Corp. v. Enviro Tech Corp.*, 730 F.2d 1476 [221 USPQ 649] (Fed. Cir.), *cert. denied* 469 U.S. 924 [224 USPQ 616] (1984). The court must compare the accused device with the claims of the patent, rather than with any particular embodiment of the patent. *CTS Corp. v. Piher Int'l Corp.*, 527 F.2d 95 [188 USPQ 419] (7th Cir. 1975), *cert. denied* 424 U.S. 978 [189 USPQ 384] (1976). If the accused device falls clearly within the claim, infringement is made out and that is the end of it. *Graver Tank & Mfg. Co. v. Linde Air Products Co.*, 339 U.S. 605 [85 USPQ 328] (1950).

Mr. Pfaff contends that all limitations on Claims 1 and 6 through 10 of his patent can be read on the Wells devices. The court disagrees, and finds no literal infringement of the Pfaff patent by the Wells device. The Wells device differs from Claim 1 of the patent-in-suit in three ways:

1. The Wells socket construction does not have "axially elongated conductive pins". Instead, it includes conductive pins that are

shortened and are rolled outwardly by a return bent portion.

2. Sub-paragraph b of Claim 1 describes "inner edges of said pins converging slightly inwardly with distance from said first major face". The conductive pins in the Wells device do not have opposed inwardly converging inner edges. Further, Wells' edges are not functionally equivalent to the inner edges of the device described in Claims 1 through 6 of the patent in suit. The inner edges of the Wells device engage only the edge of the carrier and do not overlap to secure the carrier as described and shown in the patent-in-suit. *Cf. Lockheed Aircraft Corp. v. United States*, 553 F.2d 69 [193 USPQ 449] (Ct. Cl. 1977).

3. Sub-paragraph (c) of Claim 1 describes a "unitary means . . . coacting with said inner edges of said pins . . . " The unitary spreader means of the Wells device does not coact with those inner edges of the conductive pins that define the cavity. The unitary spreader means of the Wells device coacts with an arm extended from the pins. Even if the court views the arms, as Professor Hal Watson testified on behalf of Mr. Pfaff, as inner edges of the conductive pins, those "inner edges" formed by the arms are not the same "inner edges" that define the cavity.

Because Claim 6 of the patent-in-suit incorporates Claim 1, the Wells device differs from Claim 6 in the same three ways. *Autogiro Company of America v. United States*, 384 F.2d 391 [155 USPQ 697] (Ct. Cl. 1967).

The Wells device differs from Claim 7 of the patent-in-suit in three ways:

1. The Wells socket construction does not have "axially elongated conductive contact means". Instead, it includes conductive contact means that are shortened and are rolled outwardly by a return bent portion.

2. Sub-paragraph (b) of Claim 7 describes the contact means as "having edges which incline inwardly toward said cavity in said plane substantially parallel with said first major face and outwardly from said cavity in a second plane substantially parallel with said first major face". The contact means of the Wells device are not so inclined.

3. Sub-paragraph (c) of Claim 1 describes a "unitary spreader means . . . mating with said inclined inner edges of said contact means . . . " Again, as with Claim 1, the unitary spreader means of the Wells device does not mate with those inner edges of the conductive contact means that define the cavity.

Because Claims 8, 9 and 10 of the patent-in-suit incorporate Claim 7, the Wells device differs from Claims 8, 9 and 10 in the same three ways. *Autogiro Company of America v. United States*, 384 F.2d 391 [155 USPQ 697] (Ct. Cl. 1967).

B. Doctrine of Equivalents

Mr. Pfaff also claims to have shown infringement through the doctrine of equivalents. Under this doctrine, which comes into play only if literal infringement is not found, infringement may be found "if an accused device performs substantially the same overall function or work, in substantially the same way, to obtain substantially the

same overall result as the claimed invention". *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 [4 USPQ2d 1737, 1739] (Fed. Cir. 1987) (en banc), *cert. denied* 108 S.Ct. 1474 (1988); *accord, Hughes Aircraft Co. v. United States*, 717 F.2d 1351, 1361 [219 USPQ 473, 480] (Fed. Cir. 1983). The doctrine is grounded in equity to avoid conversion of a patent into a hollow and useless thing. *Graver Tank & Mfg. Co. v. Linde Air. Products Co.*, 339 U.S. at 608 [85 USPQ at 330]. The range of equivalents to be protected depends upon the merits of the patented invention and the degree of improvement in the art. *Continental Paper Bag Co. v. Eastern Paper Bag Co.*, 210 U.S. 405 (1908); *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *Price v. Lake Sales Supply R.M., Inc.*, 510 F.2d 388 [183 USPQ 519] (10th Cir. 1974).

Wells contends that the doctrine of prosecution estoppel precludes Mr. Pfaff from the benefit of the doctrine of equivalents with respect to the Wells device. The court concurs with Wells' contention.

Under the doctrine of prosecution estoppel, one who was forced to narrow or restrict his patent's claims through amendment to convince the examiner of the device's patentability cannot rely upon the doctrine of equivalents as to the specifically amended elements or parts. *Loctite Corp. v. Ultraseal, Ltd.*, 781 F.2d 861 [228 USPQ 90] (Fed. Cir. 1985); *Thomas & Betts Corp. v. Litton Systems, Inc.*, 720 F.2d 1572 [220 USPQ 1] (Fed. Cir. 1983). The doctrine is not to be applied woodenly; because amendment of claims is a common practice in the prosecution of patent applications, not all amendments will preclude resort to the doctrine of equivalents. *Hughes Aircraft Co. v. United States*, 717 F.2d at 1362-1363 [219

USPQ at 481-482]. The doctrine of prosecution estoppel applies, however, both to amendments to overcome rejections based on prior art and to arguments submitted to obtain the patent. *Id.* at 1362 [219 USPQ at 481].

A review of the application file reveals that the patent examiner rejected Mr. Pfaff's initial application because the claims were clearly anticipated by United States Patent No. 3,753,211, issued in 1973 to William Pauza and others ("the Pauza patent"; Defendant's Exhibit ABE). The Pauza device was a direct force insertion device; an upper part operated against the outside of the pins to force them inwardly into contact with a leaded integrated circuit assembly. In traversing that rejection and amending his claims, Mr. Pfaff argued:

> Claim 1 (as now amended) includes "means operable independently of said leadless chip carrier and coacting with the *inner edges* of said pins" (emphasis added). Claim 1 has thus been amended to clearly note that the spreader means operates on the *inner* edges of the pin (as contrasted to the outer edges as shown in Pauza, et al). It is respectfully submitted, therefore, that the structure defined by Claim 1 is wholly foreign to the structure disclosed by Pauza, et al.
>
> Likewise, Claim 7 has been amended to note that the spreader means meets with the inclined *inner* edges of the contact means rather than the outer edges of the contact means as disclosed by Pauza, et al.
>
> * * *
>
> . . . since the lid means of Pauza, et al contacts the outer surface of the contact pin, and further since Pauza, et al provides no means

> whatsoever for spreading the pins to allow insertion of the leaderless chip carrier therebetween as specifically set forth in applicant's Claims 8 and 9, it is respectfully submitted that the rejection of Claims 8 and 9 is likewise inapposite and should be withdrawn.
>
> (Defendant's Exhibit B).

The patent examiner rejected Claims 1 and 6 through 10 of Mr. Pfaff's first amended application as being anticipated by United States Patent No. 4,159,861 issued in 1979 to John Anhalt ("the Anhalt patent"; Defendant's Exhibit ABF). The Anhalt patent appears to depict pins that rise from the base with an inward incline, then bend outward in a nearly semi-circular fashion; a camming device appears to work upwardly against the inner end of the semi-circle to force the pins apart.

In response, Mr. Pfaff again amended his claims. In sub-paragraph (b) of Claim 1, he added the words "axially elongated" to described the conductive pins, and added the words "opposed inner edges of the" to describe the parts of the pins that are arranged to define the cavity. In sub-paragraph (b) of Claim 7, Mr. Pfaff added the words "with their inner edges defining" to specify the portions of the contact means that define the cavity. In sub-paragraph (c) of Claim 7, Mr. Pfaff added the underlined [italics] language so the claim read, in part, "*unitary* spreader means . . . mating with *said* inclined inner edges of said contacts means . . . " Mr. Pfaff explained the importance of the amendments:

> In applicant's device, the spreader means is a *unitary means* moveable axially with respect to

> the contact pins but only a single camming surface. This camming surface mates with the *opposing inner edges* of the contact means . . . rather than folded over outer edges as shown in the [Anhalt patent]. Furthermore, applicant's device specifically defines a *unitary* spreader. . . . By using the unitary design of applicant's invention and adapting the spreader camming surface to mate with the *internal* edges of the contact pins (rather than the *external* edges as in the reference), a completely different mode of operation is produced.
>
> * * *
>
> Claim 7 (the only other independent claim) has also been amended to specifically recite that the contact means are arranged with their *inner* edges defining a rectangular cavity and that a *unitary* spreader means having an inclined surface mates with the inclined *inner edges* of the contact means to spread the contacts. As pointed out hereinabove with respect to Claim 1, the Anhalt reference does not show a *unitary* spreader means. Instead, the Anhalt spreader comprises five different parts interconnected by a connecting pin and *does not coact with the inner edges*.
>
> Instead it cams against the *outer edges* of the pins.
>
> . . . .
>
> (Defendant's Exhibit B). The application was approved as amended.

Thus, during the prosecution of his patent application, Mr. Pfaff amended Claim 1 to include the term "axially elongated" with reference to the conductive pins,

and to add the phrase "coacting with said inner edges of said pins" in reference to the spreader means. Claims that Mr. Pfaff amended to distinguish them from prior patents are those that preclude a finding of literal infringement. Mr. Pfaff cannot now contend that the Wells pins, with their return bent parts, are equivalent. He cannot now contend that the Wells device, in which the spreader coacts with the arms extended from the pins, are equivalent. The doctrine of prosecution estoppel precludes resort to the doctrine of equivalents.

III. Invalidity

By way of counterclaim, Wells contends that the Pfaff patent is invalid because of its lack of novelty, its obviousness, its development more than one year before application for a patent, and its description of an embodiment or concept not disclosed or supported by the description or specification of the patent.

A patent is presumed valid. 35 U.S.C. §282. This presumption is rebuttable, but the party claiming invalidity bears the burden of going forward, *Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881 [221 USPQ 1025] (Fed. Cir. 1984), as well as the burden of persuasion, *SSIH Equipment, S. A. v. United States International Trade Com'n*, 713 F.2d 746, 718 F.2d 365 [218 USPQ 678] (Fed. Cir. 1983), by evidence that is clear and convincing or beyond a reasonable doubt. *Hobbs v. United States Atomic Energy Com'n*, 451 F.2d 849 [171 USPQ 713] (5th Cir. 1971); *Gatch Wire Goods Co. v. W.A. Laidlaw Wire Co.*, 108 F.2d 433 [44 USPQ 5] (7th Cir. 1939). The existence of prior art not

cited by the examiner assists the satisfaction of this burden, *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452 [221 USPQ 481] (Fed. Cir. 1984); *Perkin-Elmer Corp. v. Computervision Corp.*, 732 F.2d 888 [221 USPQ 669] (Fed. Cir.), *cert. denied* 469 U.S. 857 [225 USPQ 792] (1984), but to overcome the presumption of invalidity, the party asserting invalidity still must show that the patents not cited by the examiner are more pertinent than the cited references. *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452 [221 USPQ 481] (Fed. Cir. 1984); *Solder Removal Co. v. International Trade Com'n*, 582 F.2d 628 [199 USPQ 129] (C.C.P.A. 1978); *Sing v. Culture Products, Inc.*, 469 F.Supp. 1249 [204 USPQ 848] (E.D. Mo. 1979).

A. Novelty

35 U.S.C. §102(a) states, "That a person shall be entitled to a patent unless (a) the invention was known or used by others in this country . . . before the invention thereof by the Applicant for patent . . . " To mount an attack based on want of novelty, one claiming invalidity must show the presence of each element of the claimed invention, arranged as in the claim. *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d at 1458 [221 USPQ at 485]. Wells points to its own preexisting device in support of its novelty attack.

Wells had sold a socket device known as the TO-5 contactor since the early 1970s. (Defendant's Exhibits AW and BR). The TO-5 contactor device includes a removable carrier portion for accepting a leaded transistor component. The carrier portion is sectioned so as to insulate

electrically and support the transistor leads. The device also includes a top shiftable to engage a plurality of contacts to spread the contacts so that, upon appropriate positioning of the top, the component leads are biased against the contacts. Under the operation of the TO-5 contactor, a transistor is supported by the carrier and positioned such that its leads serve merely as contact parts that are engageable with the socket contacts.

Like Claim 1 of the patent-in-suit, the TO-5 socket includes: (a) a base support means having first and second oppositely disposed major faces; (b) a plurality of axially elongated conductive pins passing transversely through said base support means substantially perpendicular to said first and second major faces; (c) the opposed inner edges of said ends of said pins extending from said first major face arranged to define a cavity . . . in a plane parallel with said first major face; (d) the inner edges of said pins converging slightly inwardly with distance from said first major face; and (e) unitary means . . . reciprocally moveable axially with respect to said pins and coacting with said opposed inner edges of said pins for uniformly spreading the ends of said pins extending from said first major face to permit the insertion of a [device] therebetween.

Like Claim 7 of the patent-in-suit, the TO-5 socket discloses: (a) a support housing having first and second oppositely disposed major faces; (b) a plurality of axially elongated contact means mounted within said support housing and extending therethrough with their axes aligned parallel to each other and normal to said first and second major faces; (c) the free ends of said contact means extending from said first major face with their

inner edges defining a cavity . . . in a plane substantially parallel with said first major face; (d) the ends of said contact means defining said cavity having edges which incline inwardly toward said cavity . . . and outwardly from said cavity . . . ; (e) unitary spreader means comprising a substantially rectangular body arranged substantially parallel with said first major face and reciprocally moveable axially with respect to said contact means; (f) said spreader means having a surface inclined with respect to the axes of said contact means and mating with said inclined inner edges of said contact means; (g) whereby movement of said spreader means axially with respect to said contact means in a first direction urges said free ends of said contact means outwardly with respect to said cavity.

The TO-5 is not, however, a mounting means for a leaderless chip carrier. The cavity defined by the pins is round; leaderless chip carriers are rectangular, and Claim 1 describes a "cavity substantially conforming to at least two oppositely disposed lateral peripheral dimensions of said leaderless chip carrier . . . " Finally, the TO-5 Contactor's unitary means does not operate independently of the device being inserted. The device or carrier is placed atop the spreader; one must push downward on the device or carrier to put it in place. While the spreader means may be depressed without pressing on the device or carrier, the resulting contact is a poor one, and the contactor would not perform the function of "wiping" the contact as advertised in Defendant's Exhibit AW.

Wells has not shown, by clear and convincing evidence, that the Pfaff patent is invalid for lack of novelty.

B. Obviousness

35 U.S.C. §103 provides, in pertinent part:

> EMA patent may not be obtained . . . if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the art to which the subject matter pertains.

Wells contends that the patent-in-suit is invalid due to obviousness. To resolve such a contention, the court must determine the scope and content of the prior art, differences between the prior art and the claims at issue, and the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17 [148 USPQ 459, 467] (1966). Evidence that the elements of the claims can be found in various prior art devices or references does not alone constitute obviousness. *Jones v. Hardy*, 727 F.2d 1524, 1528 [220 USPQ 1021, 1024-1025] (Fed. Cir. 1984). The court must consider the claimed invention as a whole, rather than as a mere catalog of parts. *In Re Antoine*, 559 F.2d 618 [195 USPQ 6] (C.C.P.A. 1977). The question is not simply whether the prior art "teaches" a particular element of the invention, but whether it would "suggest the desirability, and thus the obviousness, of making the combination". *Alco Standard Corp. v. Tennessee Valley Authority*, 808 F.2d 1490, 1498 [1 USPQ2d 1337, 1343] (Fed. Cir. 1986), *cert. denied* 108 S.Ct. 26 (1987). The matter is not be resolved by hindsight. *Medtronic Inc. v. Daig Corp.*, 611 F.Supp. 1498 [227 USPQ 509] (D. Minn. 1985), *aff'd* 789 F.2d 903 [229 USPQ 664] (Fed. Cir.), *cert. denied* 107 S.Ct. 402 (1986). The court also must consider

secondary considerations such as commercial success, long-felt but unsolved needs, and the failures of others. *Graham v. John Deere Co.*, 383 U.S. at 17 [148 USPQ at 467]; *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 [218 USPQ 871, 879] (Fed. Cir. 1983).

Wells points to several examples of prior art in support of its assertion. First, it notes its own TO-5 contactor, which is discussed above.

Wells also points to U.S. Patent No. 4,303,294, issued to Wilbur Hamsher in December, 1981 (Defendant's Exhibit H), a patent not cited by the examiner. That patent discloses (a) base support means 30 having first and second oppositely disposed major faces; (b) a plurality of axially elongated conductive pins 10 passing transversely through the base support means substantially perpendicular to said first and second major faces; (c) the opposed inner edges 14 of the pins 12 defining a cavity; (d) the inner edges 14 of the pins 12 converge slightly inwardly with distance from said first major face; (e) unitary means 40 reciprocally moveable axially with respect to the pins 12 and coacting with the opposed inner edges 14 of pins 12 for uniformly spreading the ends of pins 12 extending from the first major face.

The device shown in the Hamsher patent, however, has no unitary spreader device. It uses a rotating cam and cam follower to move the spreader. Rotation of the cam follower urges the cam upward, spreading the contacts; reversal of the rotation allows the cam to return to its downward position, allowing the contacts to close around a chip carrier.

Wells also relies on U.S. Patent No. 3,899,234, issued to Marvin Yeager and others in 1975 ("the Yeager patent"; Defendant's Exhibit S), a patent not referenced by the examiner. That patent discloses: (a) base support means 10 having first and second oppositely disposed major faces; (b) a plurality of axially elongated conductive pins 16 passing transversely through the base support means 10 substantially perpendicular to said first and second major faces; (c) the opposed inner edges 46 of pins 16 defining a cavity; (d) inner edges 46 of pins 16 converge slightly inwardly with distance from said first major face; (e) unitary means 14 reciprocally moveable axially with respect to pins 16 and coacting with the opposed inner edges 46 of pins 16 for uniformly spreading the ends of pins 16 extending from the first major face; and (f) contact means 16 . . . having edges which incline inwardly 46 toward said cavity and outwardly 44 from said cavity.

The Yeager patent, however, is a device intended for use with printed circuit boards. The Yeager patent employs a cam and cam follower rather than a unitary spreader. With respect to its contacts and means of operation, it appears no more pertinent to the Pfaff patent than the Anhalt patent.

Wells also points to U.S. Patent No. 4,390,220, issued to John Benasutti in 1983 (Defendant's Exhibit ABG), a reference cited by the examiner. That patent discloses a four-sided socket for electrically connecting an integrated circuit package to a printed circuit board. It is not, however, a zero-insertion-force device; it employs a lid that comes down to force the chip carrier into the socket. The device shown in the Benasutti patent achieves its purposes quite differently than does the Pfaff device. The

Benasutti patent has little correspondence with paragraph (c) of Claim 1 or paragraph (c) of Claim 7 of the patent-in-suit.

U.S. Patent No. 3,951,495, issued to Charles Donaher and others in 1976 (Defendant's Exhibit P), relates to a receptacle for a rectangular, leadless package. The examiner made no reference to the Donaher patent. The receptacle contains a plurality of spring contacts for electrically connecting a leadless carrier to a printed circuit board. Like the Benasutti patent, the Donaher patent has little correspondence with paragraph (c) of Claim 1 or paragraph (c) of Claim 7 of the patent-in-suit. Further, the Donaher device contacts the leaderless chip carrier only on the bottom side of the carrier ("live bug"),[4] rather than on the side and top as does the Pfaff device. The device shown in the Donaher patent is not a zero-insertion-force device. The Donaher patent is not more pertinent to the Pfaff patent than the Anhalt patent.

The examiner also made no reference to U.S. Patent No. 3,982,159, issued to Richard Dennis and others in 1976 (Defendant's Exhibit O). The Dennis patent discloses a leadless package retaining frame including a plurality of biased contact surfaces housed within a square frame for electrically connecting a leadless chip package to a circuit board. The Dennis patent does not disclose a zero-

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[4] Sockets apparently are described in the trade as being "live bug" or "dead bug". In a "live bug" socket, a chip carrier is inserted with its leads or lands toward the bottom, like the legs of a live bug. In a "dead bug" socket, the chip carrier is inserted with its leads or lands toward the top, like the legs of a dead bug.

insertion-force device and has no structure such as that described in paragraph (c) of Claim 1 or paragraph (c) of Claim 7 in the patent-in-suit. The Dennis patent discloses a "live bug" design. The Dennis patent is not more pertinent to the Pfaff patent than the Anhalt patent.

The examiner made no reference to another patent issued to Marvin Yeager, U.S. Patent No. 4,047,782, in 1977, which discloses a spreader means and a plurality of axially elongated contactors having inwardly converging inner edges engageable with the spreader means. (Defendant's Exhibit M). The device disclosed by Patent No. 4,047,782, however used a rotating cam system, and was not designed to accept leadless chip carriers. This patent is not more pertinent to the Pfaff patent than the Anhalt patent.

The examiner made no reference to U.S. Patent No. 4,045,105, issued to James Lee and others in 1977, which discloses a rectangular leadless package receptacle for mounting leadless packages. (Defendant's Exhibit ABO). The Lee patent discloses no structure such as that described in paragraph (c) of Claim 1 or paragraph (c) of Claim 7 of the patent-in-suit. It is not a zero- insertion-force device. It is designed for "live bug" insertion. The Lee patent does not appear more pertinent to the Pfaff patent than the Anhalt patent.

Wells also notes its own DIP socket (Defendant's Exhibit AV) and DIP contactor (Defendant's Exhibit AX), which disclose a shiftable top for camming open contacts that normally are closed. The socket and contactor are designed to accept a carrier with leads on two sides; they would not accept a leaderless chip carrier. The examiner

did not reference any sockets for leaded devices, but the Wells DIP socket and DIP contactor do not appear to be more pertinent to the Pfaff patent than the referenced patents.

Turning to the other factors to be considered under *Graham v. John Deere Co.*, 383 U.S. 1 [148 USPQ 459], the court finds that the level of skill in the art of housing leadless chip carriers encompasses a degree of knowledge and experience typified by mechanical design engineers working in the field of electronic device packaging. Commercial success directly related to the merits of the invention is evidenced by dramatic increases in annual sales of the patented device following its introduction in 1981. Sales of the patented device were as follows:

YEAR	SALES
1981	$ 350,000.00
1982	937,000.00
1983	2,800,000.00
1984	3,430,000.00
1985	4,088,000.00
1986	5,900,000.00

The invention's commercial success is demonstrated further by recognition that Mr. Pfaff's competitors, even those who make non-infringing devices, have been forced to accept certain features of the patented device as an industry standard, such as the output pin configuration,

top loading capability and overall product outline. (Plaintiff's Exhibits 6, 8 and 9). The Patented device immediately captured the dominant share of the market for such devices.

Based on the testimony of Dr. Hal Watson (which the court found persuasive on this issue), the foregoing examinations of the cited examples of prior art, and the commercial success achieved by the invention, the court concludes that the cited examples and references of prior art taken alone or in any combination or reconstruction reasonably suggested to one skilled in the art do not teach how to make the patented invention except by impermissible use of hindsight knowing the patent's disclosure to be the desired goal. Accordingly, the court concludes that Wells has not met its burden of proving that any claim in the patent-in-suit is invalid under 35 U.S.C. s103.

C. On Sale

35 U.S.C. §102(b) provides, "That a person shall be entitled to a patent unless . . . the invention was . . . in public use or on sale in this country, more than one year prior to the date of application for the patent in the United States . . ." Wells contends that the claims of the Pfaff patent are invalid due to the purchase order submitted by Delta V on April 8, 1981, Mr. Pfaff's detailed drawings, and the presumptions of a "deal". Mr. Pfaff filed his application for the patent-in-suit on April 19, 1982, thus establishing April 19, 1981 as the critical date before which any legally sufficient sale of the invention would result in a bar to obtaining the patent.

The claims were not reduced to practice before April 19, 1981. Reduction to practice refers to the physical act of producing the desired result by the means conceived by the inventor. *Boyce v. Anderson,* 451 F.2d 818 [171 USPQ 792] (9th Cir. 1971). *See also UMC Electronics Co. v. United States,* 816 F.2d 647 [2 USPQ2d 1465] (Fed. Cir. 1987), *cert. denied* 108 S.Ct. 748 (1988). The information was merely described on paper in the form of mechanical drawings before the critical date. No component parts had been manufactured or assembled; no testing was done until after delivery, well after the critical date. Wells has shown only that a concept of the invention existed before the critical date; that showing is insufficient under 35 U.S.C. §102(b). The patent-in-suit is not rendered invalid under §102(b).

D. Invalidity Under 35 U.S.C. §112

The first paragraph of 35 U.S.C. §112 provides in pertinent part:

> The specification shall contain a written description of the invention, and the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Wells contends that the claims of the patent-in-suit fail under this requirement. Wells argues that Claim 1 of the patent-in-suit describes a concept not disclosed in the description or specification of the patent. Sub-paragraph

(b) of Claim 1 describes "the opposed inner edges" of the conductive pins as being arranged to define a cavity and also describes "the inner edges of said pins converging slightly inwardly with distance from said first major face" of the base support for the socket. Accordingly, Wells argues, Mr. Pfaff claims that the opposed inner edges of the conductive pins that define the cavity extend from the base and also converge inwardly. Sub-paragraph (c) of Claim 1 then defines the top as a unitary means "coating with said opposed inner edges of said pins for uniformly spreading the ends of said pins". The spreader does not, however, contact the inwardly converging ends of the pins, but rather the outwardly diverging ends. Wells concludes that Claim 1, as written, describes an embodiment or concept not disclosed or supported by the description or specification of the patent.

Wells relies upon *In Re Hammack*, 427 F.2d 1384 [166 USPQ 209] (C.C.P.A. 1970), and *Ex Parte Erlich*, 3 U.S.P.Q.2d 1011 (Bd. Pat. App. & Int., 1986). Those cases, however, involved appeals from examiners' rejections of claims; this case involves a patent, entitled to a presumption of validity, in which the examiner raised no issues under §112. *See Water Technologies Corp. v. Calco Ltd.*, 658 F.Supp. 961 [1 USPQ2d 1178] (N.D. Ill. 1986), *aff'd in part and rev'd in part* 7 U.S.P.Q.2d 1097 (Fed. Cir. 1988); *Briggs v. M & J Diesel Locomotive Filter Corp.*, 228 F.Supp. 26 [141 USPQ 96] (N.D. Ill. 1964), *aff'd* 342 F.2d 573 [144 USPQ 701] (7th Cir. 1965), *cert. dismissed* 382 U.S. 801 (1965).

Recognizing that claims are not to be read in a vacuum, and that limitations therein are to be interpreted in light of the specification in giving them their broadest

reasonable interpretation, *In Re Marosi*, 710 F.2d 799 [218 USPQ 289] (Fed. Cir. 1983), the court concludes that Wells has not met its burden of overcoming the presumption of the patent's validity.

IV. Conclusion

Based on the foregoing, the court concludes that the Wells device does not literally infringe upon the patent-in-suit, and that Mr. Pfaff cannot resort to the doctrine of equivalents to prove infringement due to the doctrine of prosecution estoppel. Accordingly, judgment shall be entered for the defendant on the plaintiff's complaint.

The court further concludes that Wells has not overcome the presumption of validity of the Pfaff patent with respect to any of its challenges. Accordingly, judgment shall be entered for the plaintiff on the defendant's counterclaim.

SO ORDERED.

Title	Docket Number	Date	Disposition	Appeal from and Citation
American Federation of Government Employees, Local 900 v. Army Reserve Personnel Center	89-3175	8/15/89	AFFIRMED	MSPB
Ballentine v. Department of Justice	89-3193	8/15/89	AFFIRMED	MSPB, 39 M.S.P.R. 543
Oconto Elec., Inc. v. U.S.	89-1226	8/18/89	AFFIRMED	ASBCA
†Control Power Systems, Inc. v. TIF Instruments, Inc.	89-1330	8/18/89	AFFIRMED	D.Ct./ S.D.Fla.
†Ortloff Corp. v. Gulsby Engineering, Inc.	89-1022, 89-1047, 89-1048	8/24/89	AFFIRMED	D.Ct./ S.D.Tex., 706 F.Supp. 1295
†Klein v. Cannondale Corp.	89-1216	8/24/89	AFFIRMED IN PART AND VACATED IN PART	D.Ct./ D.Conn.
Gleaves v. Department of Navy	89-3108	8/24/89	AFFIRMED	MSPB

Lyle v. Department of Air Force	89-3120	8/24/89	AFFIRMED	MSPB
†Charleswater Products, Inc. v. Spaulding Fibre Co., Inc.	89-1223, 89-1224	8/25/89	AFFIRMED	D.Ct./ D.N.H.
O'Neil v. Department of Army	89-3174	8/25/89	AFFIRMED	MSPB
Brown v. Office of Personnel Management	89-3224	8/25/89	AFFIRMED	MSPB
Wills v. Department of Navy	89-3214	8/28/89	AFFIRMED*	MSPB
†Benn, In re	89-1115	8/29/89	AFFIRMED	PTO
Carothers & Carothers Const. Co., Inc. v. U.S.	89-1222	8/29/89	AFFIRMED	ENG BCA
†Pfaff v. Wells Electronic, Inc.	88-1607-88-1608	8/31/89	AFFIRMED IN PART AND VACATED IN PART	D.Ct./ N.D.Ind.
†Gemveto Jewelry Co., Inc. v. Jeff Cooper, Inc.	89-1055	8/31/89	AFFIRMED	D.Ct./ S.D.N.Y., 694 F.Supp. 1085

† Denotes patent appeals.
* Federal Circuit Rule 36.

§ 102. Conditions for patentability: novelty and loss of right to patent

A person shall be entitled to a patent unless —

(a) the invention was known or used by others in this country or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2) and (4) of section 371(c) of this title before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

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§ 261. Ownership; assignment

Subject to the provisions of this title, patents shall have the attributes of personal property.

Applications for patent, patents, or any interest therein, shall be assignable in law by an instrument in writing. The applicant, patentee, or his assigns or legal representatives may in like manner grant and convey an exclusive right under his application for patent, or patents, to the whole or any specified part of the United States.

A certificate of acknowledgment under the hand and official seal of a person authorized to administer oaths within the United States, or, in a foreign country, of a diplomatic or consular officer of the United States or an officer authorized to administer oaths whose authority is proved by a certificate of a diplomatic or consular officer of the United States, or apostille of an official designated by a foreign country which, by treaty or convention,

accords like effect to apostilles of designated officials in the United States, shall be prima facie evidence of the execution of an assignment, grant or conveyance of a patent or application for patent.

An assignment, grant or conveyance shall be void as against any subsequent purchaser or mortgagee for a valuable consideration, without notice, unless it is recorded in the Patent and Trademark Office within three months from its date or prior to the date of such subsequent purchase or mortgage.

* * *

AMENDMENT V [1791]

No person shall be held to answer for a capital, or otherwise infamous crime, unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the Militia, when in actual service in time of War or public danger; nor shall any person be subject for the same offence to be twice put in jeopardy of life or limb; nor shall be compelled in any criminal case to be a witness against himself, nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use, without just compensation.
